L9 ANSWER 1 OF 10 USPATFULL
AN 1999:163602 USPATFULL
TI Process to improve adhesion of cap layers in integrated circuits
IN Annapragada, Rao V., San Jose, CA, United States
PA VLSI Technology, Inc., San Jose, CA, United States (U.S. corporation)
PI US 6001747 19991214
AI US 1998-120895 19980722 (9)
DT Utility
EXNAM Primary Examiner: Bowers, Charles; Assistant Examiner: Kilday, Lisa
LREP Hickman Stephens & Coleman, LLP
CLMN Number of Claims: 23
ECL Exemplary Claim: 1
DRWN 8 Drawing Figure(s); 6 Drawing Page(s)
LN.CNT 373
SUMM . . . to crack and form rifts 30. Therefore, semiconductors need an alternative material that is both a better insulator (having a **lower dielectric constant**) and which resists cracking.
SUMM . . . standard dielectric SiO.sub.2 layer 14 in FIG. 1A to produce a methyl doped silicon oxide layer 34. Adding methyl groups **lowers** the **dielectric constant** of the methyl doped silicon oxide layer 34 to about 2.8. The methyl groups, which are added with a solvent. . .
SUMM In view of the foregoing, it is desirable to have a method that provides for a **low dielectric constant, low**-cracking insulating material that adheres well to the cap layer all in the same semiconductor apparatus without adding significant time or. . .
SUMM . . . a cap layer. Methyl doped silicon oxide material is an improvement over a standard dielectric material because it has a **lower dielectric constant**. Furthermore, methyl doped silicon oxide material can also be made much thicker than normal dielectric material because it resists cracking.. . .
DETD . . . hydrogen peroxide (H.sub.2 O.sub.2) 44 which condense on top of the metal layer 40 in what is known as the **Flowfill** process. The methyl doped silicon oxide layer thickness t.sub.3 is generally at least about 3,000 Angstroms. Preferably, the methyl doped. . .

L9 ANSWER 2 OF 10 USPATFULL
AN 1999:146469 USPATFULL
TI Method of depositing silicon oxides
IN Sandhu, Gurtej S., Boise, ID, United States
Iyer, Ravi, Boise, ID, United States
PA Micron Technology, Inc., Boise, ID, United States (U.S. corporation)
PI US 5985770 19991116
AI US 1997-915987 19970821 (8)
DT Utility
EXNAM Primary Examiner: Bowers, Charles; Assistant Examiner: Nguyen, Thanh
LREP Wells, St. John, Roberts, Gregory & Matkin, P.S.
CLMN Number of Claims: 11
ECL Exemplary Claim: 1
DRWN No Drawings
LN.CNT 245
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
SUMM One known way of achieving desired **lower dielectric constant** silicon oxides, such as silicon dioxide, is to provide

suitable dopant atoms within the material. Fluorine is but one example,.

. .

SUMM . . . having high aspect ratio topography, has been developed by Electrotech Limited of Bristol, U.K., and is referred to as a **Flowfill**.TM. technology. In such process, SiH.sub.4 and H.sub.2 O.sub.2 are separately introduced into a CVD chamber, such as a parallel plate. . .

L9 ANSWER 3 OF 10 USPATFULL
AN 1999:137782 USPATFULL
TI Multi-level conductive structure including low capacitance material
IN Tobben, Dirk, Fishkill, NY, United States
Weigand, Peter, Unterhaching, Germany, Federal Republic of
PA Siemens Aktiengesellschaft, Munich, Germany, Federal Republic of (non-U.S. corporation)
PI US 5977635 19991102
AI US 1997-939208 19970929 (8)
DT Utility
EXNAM Primary Examiner: Kelley, Nathan K.
LREP Braden, Stanton C.
CLMN Number of Claims: 17
ECL Exemplary Claim: 1
DRWN 10 Drawing Figure(s); 4 Drawing Page(s)
LN.CNT 534

AB . . . method includes depositing a low capacitance material 908 into the trench. The low capacitance material represents a material having a **dielectric constant lower** than a **dielectric constant** of the first dielectric layer.

SUMM . . . conductive layer and at least substantially through the first dielectric layer. The low capacitance material represents a material having a **dielectric constant lower** than a **dielectric constant** of the first dielectric layer.

SUMM . . . the method includes depositing a low capacitance material into the trench. The low capacitance material represents a material having a **dielectric constant lower** than a **dielectric constant** of the first dielectric layer.

DETD Although it may be desired, in some cases, to replace much of the high capacitance dielectric material with the **low-K** fill (i.e., to etch substantially through the dielectric layer), the exact depth of the trenches is determined, in part, by. . .

DETD As the term is used herein, a low capacitance dielectric material represents a material having a **lower dielectric constant** than the material it replaces, e.g., lower than the dielectric material of dielectric layer 112 or the nitride material in. . . has a dielectric constant in the range below about 3. In one embodiment, the low capacitance material is preferably a **low dielectric constant** (**low K**) spin-on material such as hydrogen silsesquioxane SOG (e.g., Dow Corning's Fox.RTM.), methyl silsesquioxane SOG, organic spin-on polymers (including polyimides, polybenzoxazoles, polyarylethers, or the like), and even spin-on aerogels. A self-leveling chemical vapor deposition (CVD) film (e.g., Trikon Technologies's **low-K Flowfill**.RTM.) may also be used in accordance with yet another embodiment of the invention.

DETD . . . 112. Even if the prior art trenches (which do not substantially extend into the dielectric layer) are filled with a **low K** material, as is done in some prior art structures (i.e., even if the trenches between conductive lines 503/505 and conductive lines 505/508 of prior art FIG. 4 are filled with a **low K** material), this approach still does not address the fact that field lines between prior art conductive plugs 303 and 305. . .

CLM What is claimed is:
. . . plug and said second conductive plug to reduce capacitive coupling therebetween, said low capacitance material representing a material having a **dielectric constant lower** than a **dielectric constant** of said first dielectric layer, wherein said first conductive plug is isolated from said low capacitance material by first dielectric. . .

9. The multi-level conductive structure of claim 8 wherein said **dielectric constant** of said **low** capacitance material is **lower** than a **dielectric constant** of said nitride layer.

. . . plug and said second metal plug to reduce capacitive coupling therebetween, said low capacitance material representing a material having a **dielectric constant lower** than a **dielectric constant** of said first dielectric layer, wherein said first conductive plug is isolated from said low capacitance material by first dielectric. . .

11. The dynamic random access memory circuit of claim 10 wherein said **dielectric constant** of said **low** capacitance material is below about 3.

. . . 15. The dynamic random access memory circuit of claim 14 wherein said second dielectric layer represents a nitride layer, said **dielectric constant** of said **low** capacitance material is **lower** than a **dielectric constant** of said nitride layer.

L9 ANSWER 4 OF 10 USPATFULL
AN 1999:122736 USPATFULL
TI Method of planarizing the semiconductor structure
IN Ilg, Matthias, Fishkill, NY, United States
Tobben, Dirk, Fishkill, NY, United States
Weigand, Peter, Croton on Hudson, NY, United States
PA Siemens Aktiengesellschaft, Munich, Germany, Federal Republic of (non-U.S. corporation)
PI US 5963837 19991005
AI US 1997-846924 19970430 (8)
DT Utility
EXNAM Primary Examiner: Chaudhari, Chandra; Assistant Examiner: Nguyn, Thanh
LREP Braden, Stanton C.
CLMN Number of Claims: 14
ECL Exemplary Claim: 1
DRWN 4 Drawing Figure(s); 2 Drawing Page(s)
LN.CNT 317
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
SUMM . . . i.e., relatively flat. Thus, it is necessary to fill these gaps width a suitable material, preferably a material with a **low dielectric constant** to prevent coupling between the adjacent electrodes and provide a planar surface over both the high and low aspect ratio. . .
SUMM . . . i.e., the first portion of the gap filling material, being substantially free of such contaminants and dopant, has a relatively **low dielectric constant** thereby reducing electrical coupling between adjacent electrodes.
DETD . . . further, the dielectric constant of the material filing the gaps 28, being substantially free of such contaminants, has a relatively **low dielectric constant** (i.e., in the order of 3.0 to 3.8) thereby reducing electrical coupling between adjacent

gate electrodes.

DETD . . . . described above instead of using such spin deposited process. One such material which may be used with gaseous deposition is **Flowfill** material sold by PMT-Electrotech, Chatsworth, Calif. Still further, the process may be used to fill gaps other then gaps between. . .

L9 ANSWER 5 OF 10 INSPEC COPYRIGHT 2000 IEE

AN 2000:6492123 INSPEC DN B2000-03-2550E-045

TI A selective CMP process for stacked **low-k** CVD oxide films.

AU Hartmannsgruber, E.; Zwicker, G. (Fraunhofer-Inst. fur Siliziumtechnol., Itzehoe, Germany); Beekmann, K.

SO Microelectronic Engineering (Jan. 2000) vol.50, no.1-4, p.53-8. 5 refs.
Doc. No.: S0167-9317(99)00264-6
Published by: Elsevier
Price: CCCC 0167-9317/2000/$20.00
CODEN: MIENEF ISSN: 0167-9317
SICI: 0167-9317(200001)50:1/4L.53:SPSO;1-6
Conference: Third European Workshop on Materials for Advanced Metallization. Ostende, Belgium, 7-10 March 1999

DT Conference Article; Journal

TC Practical

CY Netherlands

LA English

TI A selective CMP process for stacked **low-k** CVD oxide films.

AB A chemical mechanical polishing process for a stacked **low-k** dielectric material, which is suitable for inter-metal dielectric applications, has been developed. The dielectric is deposited by CVD and composed of a methyl-doped silicon oxide (i.e., **low-k Flowfill**) embedded between thin SiO2 layers. A new CMP parameter is introduced, which is the removal rate selectivity between two different kinds of materials. We were able to adjust the selectivity between cap and **low-k Flowfill** layer in a range between 3:1 and 1:5 by tuning the slurry mixture. Different test structures were used to investigate. . . effect of the removal rate selectivity on the planarisation efficiency of the CMP process. A higher removal rate of the **low-k Flowfill** layer in comparison to that of the cap layer results in a significant increase of-the planarisation length and a reduction. .. .

ST selective CMP process; **stacked low-k CVD oxide films**; chemical mechanical polishing process; inter-metal dielectric applications; methyl-doped silicon oxide; **low-k Flowfill**; removal rate selectivity; slurry mixture; planarisation efficiency; cap layer; overpolish; planarity; SiO2

L9 ANSWER 6 OF 10 INSPEC COPYRIGHT 2000 IEE

AN 1999:6368334 INSPEC DN B1999-11-2550F-010

TI CVD **low-k** for gap fill and planarisation.

AU McClatchie, S.; Beekmann, K.; Kiermasz, A. (Trikon Technol., UK)

SO European Semiconductor (Aug. 1999) vol.21, no.8, p.32-3. 6 refs.
Published by: Angel Publishing
CODEN: EUSEEK ISSN: 0265-6027
SICI: 0265-6027(199908)21:8L.32:FP;1-0

DT Journal

TC Practical; Experimental

CY United Kingdom

LA English

TI CVD **low-k** for gap fill and planarisation.

AB. . . inter-level dielectric has begun to directly contribute to IC delay times. This has led the industry to search for new **low-k** materials to replace SiO2. This article describes one approach, a silicon-based film called **Low k Flowfill**.

Using its **Flowfill** CVD process, Trikon Technologies has demonstrated gap fill and planarisation of k=2.7 dielectric material and integration into 0.25-0.18 mu m. . . .

ST **CVD low-k ILD**; gap fill; planarisation; silicon dioxide; VLSI interlayer dielectric applications; ULSI interlayer dielectric applications; metal interconnects; isolation; dielectric constant; device geometries; packing density; operating speed; inter-level dielectric; IC delay times; **low-k dielectric materials; silicon-based Low k Flowfill film; Flowfill CVD process**; dielectric material; dielectric material integration; aluminium subtractive etch interconnects;
0.18 to 0.25 micron; Al; SiO2

L9 ANSWER 7 OF 10 EUROPATFULL COPYRIGHT 2000 WILA

PATENT APPLICATION - PATENTANMELDUNG - DEMANDE DE BREVET

AN 960958 EUROPATFULL ED 19991212 EW 199948 FS OS
TIEN Method for producing hydrogenated silicon oxycarbide films.
TIDE Verfahren zur Herstellung von hydriertem Silizium-Oxy-Karbid.
TIFR Procede pour la preparation de silicium-oxy-carbure hydrogene.
IN Loboda, Mark Jon, 1902 Vine Street, Midland, Michigan 48640, US; Seifferly, Jeffrey Alan, 3007 Linden Park Drive, Bay City, Michigan 48706, US
PA DOW CORNING CORPORATION, 3901 S. Saginaw Road, Midland Michigan 48686-0994, US
PAN 275274
AG Patentanwaelte Sternagel & Fleischer, Braunsberger Feld 29, 51429 Bergisch Gladbach, DE
AGN 101441
OS ESP1999088 EP 0960958 A2 991201
SO Wila-EPZ-1999-H48-T1a
DT Patent
LA Anmeldung in Englisch; Veroeffentlichung in Englisch
DS R AT; R BE; R CH; R CY; R DE; R DK; R ES; R FI; R FR; R GB; R GR; R IE; R IT; R LI; R LU; R MC; R NL; R PT; R SE; R AL; R LT; R LV; R MK; R RO; R SI
PIT EPA2 EUROPAEISCHE PATENTANMELDUNG
PI EP 960958 A2 19991201
OD 19991201
AI EP 1999-110260 19990527
PRAI US 1998-86811 19980529

ABEN This invention is a method for producing hydrogenated silicon oxycarbide (H:SiOC) films having a **low dielectric constant**. This method comprises reacting an methyl-containing silane in a controlled oxygen environment using plasma enhanced or ozone assisted chemical vapor. . . .

DETDEN. . . have high dielectric constants (i.e. 3.8 or greater). Therefore there is a need for processes and materials that result in **low dielectric constant** films. A new deposition processes known as **Low-k Flowfill**.reg., produces films having a dielectric constant of <3.0. This method uses a chemical vapor deposition reaction between methylsilane and hydrogen peroxide to produce a methyl doped silicon oxide film (See S. McClatchie, K. Beekmann, A. Kiermasz; **Low Dielectric Constant** Oxide Films Deposited Using CVD Techniques, 1988 DUMIC Conference Proceedings, 2/98, p. 311-318). However, this process requires a non standard. . . .
An object of this invention is to provide a method for producing **low dielectric constant** thin films of hydrogenated silicon oxycarbide by chemical vapor deposition.
This invention pertains to a method of producing thin films of hydrogenated silicon oxycarbide (H:SiOC) having **low**

dielectric constants on substrates, preferably
semiconductor devices. The method comprises the plasma enhanced or
. ozone
enhanced chemical vapor deposition of a reaction. . .
The films produced, due to the **low dielectric**
constant, are particularly suited as interlayer dielectrics in
semiconductor integrated circuit manufacturing such as gate
dielectrics,
premetal and intermetal dielectrics and. . .

L9 ANSWER 8 OF 10 EUROPATFULL COPYRIGHT 2000 WILA

PATENT APPLICATION - PATENTANMELDUNG - DEMANDE DE BREVET

AN 905778 EUROPATFULL ED 19990411 EW 199913 FS OS
TIEN Improved multi-level conductive structure and methods therefor.
TIDE Verbesserte Mehrlagenleitungsstruktur und Verfahren dafuer.
TIFR Structure conductrice amelioree a plusieurs niveaux et procede de fabrication.
IN Tobben, Dirk, 12 Bayberry Circle, Fishkill, NY 12524, US;
Weigand, Peter, Rathausplatz 2, 82008 Unterhaching, DE
PA SIEMENS AKTIENGESELLSCHAFT, Wittelsbacherplatz 2, 80333 Muenchen, DE
PAN 200520
AG PatentanwaelteWestphal, Mussgnug & Partner, Waldstrasse 33, 78048 Villingen-Schwenningen, DE
AGN 100411
OS ESP1999025 EP 0905778 A2 990331
SO Wila-EPZ-1999-H13-T2b
DT Patent
LA Anmeldung in Englisch; Veroeffentlichung in Englisch
DS R AT; R BE; R CH; R CY; R DE; R DK; R ES; R FI; R FR; R GB; R GR; R IE; R IT; R LI; R LU; R MC; R NL; R PT; R SE
PIT EPA2 EUROPAEISCHE PATENTANMELDUNG
PI EP 905778 A2 19990331
OD 19990331
AI EP 1998-116755 19980904
PRAI US 1997-939208 19970929
ABEN. . . method includes depositing a low capacitance material 908 into
the
trench. The low capacitance material represents a material having a
dielectric constant lower than a
dielectric constant of the first dielectric layer.
DETDEN. . . conductive layer and at least substantially through the first
dielectric layer. The low capacitance material represents a material
having a **dielectric constant lower** than a
dielectric constant of the first dielectric layer.
In . . . the method includes depositing a low capacitance material
into the trench. The low capacitance material represents a material
having a **dielectric constant lower** than a
dielectric constant of the first dielectric layer.
Although it may be desired, in some cases, to replace much of the high
capacitance dielectric material with the **low-K** fill
(i.e., to etch substantially through the dielectric layer), the exact
depth of the trenches is determined, in part, by. . .
As the term is used herein, a low capacitance dielectric material
represents a material having a **lower dielectric**
constant than the material it replaces, e.g., lower than the
dielectric material of dielectric layer 112 or the nitride material in.
. . has a dielectric constant in the range below about 3. In one
embodiment, the low capacitance material is preferably a **low**
dielectric constant (**low K**)
spin-on material such as hydrogen silsesquioxane SOG (e.g., Dow
Corning's Fox.reg.), methyl silsesquioxane SOG, organic spin-on
polymers
(including polyimides, polybenzoxazoles, polyarylethers, or the like),

and even spin-on aerogels. A self-leveling chemical vapor deposition (CVD) film (e.g., Trikon Technologies's **low-K Flowfill**.reg.) may also be used in accordance with yet another embodiment of the invention.
Further, . . . 112. Even if the prior art trenches (which do not substantially extend into the dielectric layer) are filled with a **low K** material, as is done in some prior art structures (i.e., even if the trenches between conductive lines 503/505 and conductive lines 505/508 of prior art Fig. 4 are filled with a **low K** material), this approach still does not address the fact that field lines between prior art conductive plugs 303 and 305. . .

CLMEN. . . conductive layer and at least substantially through said first dielectric layer, said low capacitance material representing a material having a **dielectric constant lower** than a **dielectric constant** of said first dielectric layer.
9. The multi-level conductive structure of claim 8 wherein said **dielectric constant** of said **low** capacitance material is **lower** than a **dielectric constant** of said first nitride layer.
10. . . . metal layer and at least substantially through said first dielectric layer, said low capacitance material representing a material having a **dielectric constant lower** than a **dielectric constant** of said first dielectric layer.
11. The dynamic random access memory circuit of claim 10 wherein said **dielectric constant** of said **low** capacitance material is below about 3.
15. The dynamic random access memory circuit of claim 14 wherein said second dielectric layer represents a nitride layer, said **dielectric constant** of said **low** capacitance material is **lower** than a **dielectric constant** of said nitride layer.
16. . . . layer; and
depositing a low capacitance material into said trench, said low capacitance material representing a material having a **dielectric constant lower** than a **dielectric constant** of said first dielectric layer.
22. The method of claim 21 wherein said **dielectric constant** of said **low** capacitance material is **lower** than a **dielectric constant** of said first nitride layer.

L9 ANSWER 9 OF 10 EUROPATFULL COPYRIGHT 2000 WILA

PATENT APPLICATION - PATENTANMELDUNG - DEMANDE DE BREVET

AN	875930 EUROPATFULL ED 19981115 EW 199845 FS OS
TIEN	Planarization of an interconnection structure.
TIDE	Planarisierung einer Leiterbahnstruktur.
TIFR	Planarisation d'une structure d'interconnexion.
IN	Ilg, Matthias, 4 North Mulberry Street, Richmond, VA 23220, US; Tobben, Dirk, 12 Bayberry Circle, Fishkill, NY 12524, US; Weigand, Peter, Rathausplatz 2, 82008 Unterhaching, DE
PA	SIEMENS AKTIENGESELLSCHAFT, Wittelsbacherplatz 2, 80333 Muenchen, DE
PAN	200520
AG	PatentanwaelteWestphal, Buchner, MussgnugNeunert, Goehring, Waldstrasse 33, 78048 Villingen-Schwenningen, DE
AGN	100411
OS	ESP1998078 EP 0875930 A2 981104
SO	Wila-EPZ-1998-H45-T2b
DT	Patent
LA	Anmeldung in Englisch; Veroeffentlichung in Englisch
DS	R AT; R BE; R CH; R DE; R DK; R ES; R FI; R FR; R GB; R GR; R IE; R IT; R LI; R LU; R MC; R NL; R PT; R SE
PIT	EPA2 EUROPAEISCHE PATENTANMELDUNG

PI EP 875930 A2 19981104
OD 19981104
AI EP 1998-105151 19980321
PRAI US 1997-846924 19970430
DETDEN. . . . i.e., relatively flat. Thus, it is necessary to fill these gaps width a suitable material, preferably a material with a **low dielectric constant** to prevent coupling between the adjacent electrodes and provide a planar surface over both the high and low aspect ratio. . . .

The . . . i.e., the first portion of the gap filling material, being substantially free of such contaminants and dopant, has a relatively **low dielectric constant** thereby reducing electrical coupling between adjacent electrodes.

Thus, . . . further, the dielectric constant of the material filing the gaps 28, being substantially free of such contaminants, has a relatively **low dielectric constant** (i.e., in the order of 3.0 to 3.8) thereby reducing electrical coupling between adjacent gate electrodes.

Other . . . described above instead of using such spin deposited process. One such material which may be used with gaseous deposition is **Flowfill** material sold by PMT-Electrotech, Chatsworth, CA. Still further, the process may be used to fill gaps other then gaps between. . .

L9 ANSWER 10 OF 10 EUROPATFULL COPYRIGHT 2000 WILA

PATENT APPLICATION - PATENTANMELDUNG - DEMANDE DE BREVET

AN 875929 EUROPATFULL ED 19981115 EW 199845 FS OS
TIEN Planarisation of an interconnect structure.
TIDE Planarisierung einer Leiterbahnstruktur.
TIFR Planarisation d'une structure d'interconnexion.
IN Ilg, Matthias, 4 North Mulberry Street, Richmond, VA 23220, US; Tobben, Dirk, 12 Bayberry Circle, Fishkill, NY 12524, US; Weigand, Peter, Rathausplatz 2, 82008 Unterhaching, DE
PA SIEMENS AKTIENGESELLSCHAFT, Wittelsbacherplatz 2, 80333 Muenchen, DE
PAN 200520
AG PatentanwaelteWestphal, Buchner, MussgnugNeunert, Goehring, Waldstrasse 33, 78048 Villingen-Schwenningen, DE
AGN 100411
OS ESP1998078 EP 0875929 A2 981104
SO Wila-EPZ-1998-H45-T2b
DT Patent
LA Anmeldung in Englisch; Veroeffentlichung in Englisch
DS R AT; R BE; R CH; R DE; R DK; R ES; R FI; R FR; R GB; R GR; R IE; R IT; R LI; R LU; R MC; R NL; R PT; R SE
PIT EPA2 EUROPAEISCHE PATENTANMELDUNG
PI EP 875929 A2 19981104
OD 19981104
AI EP 1998-105150 19980321
PRAI US 1997-846925 19970430
ABEN. . . . the gaps, i.e., the first portion of the gap filling material, being substantially free of such contaminants, has a relatively **low dielectric constant** thereby reducing electrical coupling between adjacent electrodes. The self-planarizing material is a flowable material. The flowable oxide may be spun. . . .

DETDEN. . . . adjacent pair thereof. Thus, it is necessary to fill these gaps width a suitable material, preferably a material with a **low dielectric constant** to prevent coupling between the adjacent electrodes as well as to provide a planar surface for subsequent photolithography.

In . . . the gaps, i.e., the first portion of the gap filling material, being substantially free of such contaminants, has a

relatively **low dielectric constant** thereby reducing electrical coupling between adjacent electrodes.

Thus, . . . the first, lower portion 26 of the gap filling material 24, being substantially free of such contaminants, has a relatively **low dielectric constant** (i.e., in the order of 3.6 to 4.0) thereby reducing electrical coupling between adjacent gate electrodes.

Other . . . described above instead of using such spin deposited process. One such material which may be used with gaseous deposition is **Flowfill** material sold by PMT-Electrotech, Chatsworth, CA.

L6 ANSWER 2 OF 22 USPATFULL
AN 1999:170931 USPATFULL
TI Integrated circuit dielectric and method
IN Lu, Jiong-Ping, Dallas, TX, United States
Jin, Changming, Plano, TX, United States
PA Texas Instruments Incorporated, Dallas, TX, United States (U.S. corporation)
PI US 6008540 19991228
AI US 1998-87458 19980528 (9)
PRAI US 1997-47794 19970528 (60)
DT Utility
EXNAM Primary Examiner: Crane, Sara; Assistant Examiner: Vu, Hung Kim
LREP Hoel, Carlton H.; Donaldson, Richard L.
CLMN Number of Claims: 2
ECL Exemplary Claim: 1
DRWN 27 Drawing Figure(s); 18 Drawing Page(s)
LN.CNT 573
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
SUMM . . . adhesion by plasma activation, ion beam shell formation, or open surface pore filling deposition and/or with reducing atmosphere sintering to **lower dielectric constant** and incorporated as a multilevel integrated circuit dielectric.
SUMM This has the advantages of manufacturable interlevel dielectrics incorporating xerogel to **lower dielectric constant**.
DETD . . . dry the xerogel at high temperatures (e.g., 450.degree. C.) in a reducing atmosphere (e.g., forming gas or hydrogen) to achieve **low dielectric constant.**
DETD . . . relative pore volume in the gaps may be higher than the relative pore volume above the interconnects, and thus the **dielectric constant may be lower** in the gaps than above the interconnects.
DETD --Si(**CH3**)3+O2.fwdarw.--**SiO**+CO2+H2O
DETD . . . nm oxide liner on the interconnects (see liner 140 in FIG. 1d) could be replaced by other dielectric materials to **lower effective dielectric constant**. In particular, any conformally depositable material which does not react with the interconnect metal and to which xerogel will stick. . . .

L6 ANSWER 3 OF 22 USPATFULL
AN 1999:163764 USPATFULL
TI Curable compositions containing cycloolefin and filler
IN Setiabudi, Frans, Eschbach, Germany, Federal Republic of
PA Ciba Specialty Chemicals Corp., Tarrytown, NY, United States (U.S. corporation)
PI US 6001909 19991214
AI US 1996-736703 19961028 (8)
PRAI CH 1995-3108 19951102
DT Utility
EXNAM Primary Examiner: Mulcahy, Peter D.
LREP Kovaleski, Michele A.; Crichton, David R.
CLMN Number of Claims: 18
ECL Exemplary Claim: 1
DRWN No Drawings
LN.CNT 1075
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
SUMM . . . wherein X.sub.3 is --CHR.sub.16 --, oxygen or sulfur, R.sub.14 and R.sub.15 are each independently of the other hydrogen, --CN,

trifluoromethyl, (**CH**.sub.**3**).sub.3 **SiO**--, (
CH.sub.**3**).sub.3 Si-- or --COOR.sub.17, and R.sub.16
and R.sub.17 are each independently of the other hydrogen, C.sub.1
-C.sub.12 alkyl, phenyl or benzyl;

SUMM . . . hydrogen, C.sub.1 -C.sub.12 alkyl, phenyl or benzyl, and R.sub.20 and R.sub.21 are each independently of the other hydrogen, CN, trifluoromethyl, (**CH**.sub.**3**).sub.3 **SiO**--, (**CH**.sub.**3**).sub.3 Si-- or --COOR.sub.23, and R.sub.23 is hydrogen, C.sub.1 -C.sub.12 alkyl, phenyl or benzyl;

SUMM . . . of this invention have, in particular, high heat stability, excellent toughness and mechanical solidity as well as excellent electrical properties (**low dielectric constant**, **low** loss factor or tan .delta. value) and are especially suitable for use in the vacuum casting technology, preferably as encapsulating. . .

L6 ANSWER 4 OF 22 USPATFULL
AN 1999:163602 USPATFULL
TI Process to improve adhesion of cap layers in integrated circuits
IN Annapragada, Rao V., San Jose, CA, United States
PA VLSI Technology, Inc., San Jose, CA, United States (U.S. corporation)
PI US 6001747 19991214
AI US 1998-120895 19980722 (9)
DT Utility
EXNAM Primary Examiner: Bowers, Charles; Assistant Examiner: Kilday, Lisa
LREP Hickman Stephens & Coleman, LLP
CLMN Number of Claims: 23
ECL Exemplary Claim: 1
DRWN 8 Drawing Figure(s); 6 Drawing Page(s)
LN.CNT 373

AB A method for making a multi-layered integrated circuit structure, includes depositing a **methyl** doped **silicon oxide** layer over a substrate. SiO.sub.2 skin is deposited on the **methyl** doped **silicon oxide** layer by decreasing the flow of CH.sub.3 SiH.sub.3, increasing the flow of SiH.sub.4 and keeping the flow of H.sub.2 O.sub.2. . .

SUMM . . . manufacturing processes, and more particularly to techniques for improving the adhesion of a cap layer to an underlayer that includes **methyl** doped **silicon oxide** material that is vapor deposited.

SUMM . . . to crack and form rifts 30. Therefore, semiconductors need an alternative material that is both a better insulator (having a **lower dielectric constant**) and which resists cracking.

SUMM . . . semiconductor structure is to add methyl groups to the standard dielectric SiO.sub.2 layer 14 in FIG. 1A to produce a **methyl** doped **silicon oxide** layer 34. Adding **methyl** groups **lowers** the **dielectric constant** of the **methyl** doped **silicon oxide** layer 34 to about 2.8. The methyl groups, which are added with a solvent free operation allows a thickness t.sub.2. . .

SUMM . . . (CMP) process used to planarize the cap layer. This is because the cap layer 12 doesn't adhere well to the **methyl** doped **silicon oxide** layer 34.

SUMM In view of the foregoing, it is desirable to have a method that provides for a **low dielectric constant**, **low** -cracking insulating material that adheres well to the cap layer all in the same semiconductor apparatus without adding significant time or. . .

SUMM . . . invention fills these needs by providing an efficient and economical method for improving adhesion of a cap oxide to a **methyl** doped **silicon oxide** material. It

should be appreciated that the present invention can be implemented in numerous ways, including as a process, an. . . .

SUMM In one embodiment, a method for making a multi-layered integrated circuit structure is disclosed. This method includes: (a) depositing a **methyl** doped **silicon oxide** layer with a first thickness over a substrate under a first set of conditions; (b) depositing a SiO_2 skin with a second thickness on the **methyl** doped **silicon oxide** layer under a second set of conditions wherein the second thickness is substantially thinner than said first thickness; and (c) depositing a cap layer adhering on the SiO_2 skin under a third set of conditions. The **methyl** doped **silicon oxide** is preferably **CH**.sub.**3** **SiO**.sub.2. In addition, the depositions are preferably performed in a same semiconductor apparatus.

SUMM . . . the volume of H_2O_2 is held constant over a period of time to produce a SiO_2 skin over the **methyl** doped **silicon oxide** layer. The period of time is preferably in the range of about 10-20 seconds.

SUMM An advantage of the present invention is that it improves adhesion between a **methyl** doped **silicon oxide** layer and a cap layer. **Methyl** doped **silicon oxide** material is an improvement over a standard dielectric material because it has a **lower dielectric constant**. Furthermore, **methyl** doped **silicon oxide** material can also be made much thicker than normal dielectric material because it resists cracking. Both of these factors allow the **methyl** doped **silicon oxide** layer to reduce inter-metal capacitance in the integrated circuit.

SUMM An additional advantage of the present invention is that it improves the adhesion of the **methyl** doped **silicon oxide** layer and the cap layer with minimal additional procedures, time and expense. Formation of the SiO_2 skin can be accomplished using the same semiconductor apparatus that is used to deposit both the **methyl** doped **silicon oxide** layer and the cap layer.

SUMM . . . of the present invention requires minimal additional cost and time because it can be completed in a few seconds between **methyl** doped **silicon oxide** layer and cap layer deposition.

DRWD FIG. 1B is a cross-sectional view illustrating several layers of a prior art integrated circuit incorporating a **methyl** doped **silicon oxide** layer.

DRWD FIG. 6 is a flow chart of a method for improving adhesion of a cap layer to a **methyl** doped **silicon oxide** layer in accordance with the present invention.

DETD An invention for a method to improve adhesion of a cap layer to a **methyl** doped **silicon oxide** layer is disclosed. In the following description, numerous specific details are set forth in order to provide a thorough understanding. . . .

DETD . . . the process, a metal layer 40 is deposited on top of a semiconductor substrate 38, and is then patterned. A **methyl** doped **silicon oxide** layer 42 is deposited on top of the metal layer 40 to act as an insulator as illustrated in FIG. 3A. The presence of the methyl groups reduces the dielectric constant of the **methyl** doped **silicon oxide** layer 42. In addition, the methyl groups, which are added in a solvent free operation, also add crack resistant characteristics. . . .

DETD The **methyl** doped **silicon oxide** layer 42 is deposited in a semiconductor apparatus by mixing a gaseous combination of methyl silane (CH_3SiH_3) and hydrogen. . . O.sub.2) 44 which condense on top of the metal layer 40 in what is known as the

Flowfill process. The **methyl** doped **silicon oxide** layer thickness t.sub.3 is generally at least about 3,000 Angstroms. Preferably, the **methyl** doped **silicon oxide** layer 42 is composed of **CH**.sub.**3** **SiO**.sub.x having a thickness t.sub.3 is about 3,000 to about 10,000 Angstroms where x varies from about 1.5 to about 1.9. The percentage of methyl in the **methyl** doped **silicon oxide** layer 42 is about 10% to about 25%.

DETD . . . SiO.sub.2 skin 46. By "skin" it is meant that a thin film or layer of SiO.sub.2 is formed over the **methyl** doped **silicon oxide** layer 42. The integrated circuit 36 remains in the same semiconductor apparatus, which is preferably a cluster tool including a chemical vapor deposition (CVD) chamber. At the end of the operation that deposits the **methyl** doped **silicon oxide** layer 42, the volume of CH.sub.3 SiH.sub.3 flowing over the integrated circuit 36 is decreased, and the volume of silane. . . .

DETD . . . 46 is formed by a gaseous combination of SiH.sub.4 and H.sub.2 O.sub.2 48 which then condenses on top of the **methyl** doped **silicon oxide** layer 42.

DETD The CVD tool operates preferably from about 0.2 Torr to about 1.5 Torr. The **methyl** doped **silicon oxide** 42 should have a dielectric constant of between about 2.7 and about 3.0, and preferably a dielectric constant of 2.8.. . .

DETD . . . The cap layer 49 adheres to the SiO.sub.2 skin 46 and resists peeling because the methyl groups present in the **methyl** doped **silicon oxide** layer 42 are buffered from the cap layer 49 by the SiO.sub.2 skin 46. After the CMP process, the cap. . .

DETD . . . flow chart encompasses a process 54 of making a semiconductor structure that improves adhesion of a cap layer to a **methyl** doped **silicon oxide** layer. The method 54 begins at an operation 56 where a metal layer is deposited and patterned onto the semiconductor substrate. The metal layer typically comprises of conductive metal traces. In an operation 58, a **methyl** doped **silicon oxide** layer is deposited onto the metal layer using chemical vapor deposition (CVD). **Methyl** doped **silicon oxide** material is used because it is a better insulator than the standard dielectric material and also because it resists cracking.

DETD . . . operation 62 deposits a cap layer which adheres to the SiO.sub.2 skin, thus allowing usage of methyl groups in the **methyl** doped **silicon oxide** layer. The **methyl** groups improve the insulating and crack resisting characteristics of the **methyl** doped **silicon oxide** layer.

CLM What is claimed is:

1. A method for making a multi-layered integrated circuit structure comprising: depositing a **methyl** doped **silicon oxide** layer with a first thickness over a substrate under a first set of conditions; depositing a SiO.sub.2 skin with a second thickness on said **methyl** doped **silicon oxide** layer under a second set of conditions wherein said second thickness is substantially thinner than said first thickness; and depositing. . .

. . . . for making a multi-layered integrated circuit structure as recited in claim 1 wherein said methyl group is from the group **CH**.sub. **3** **SiO**.sub.x.

. . . . method for making a multi-layered integrated circuit structure as recited in claim 2 wherein the value x in said group **CH**.sub. **3** **SiO**.sub.x is about 1.5 to about 1.9.

13. A method for making a multi-layered integrated circuit structure as

recited in claim 1 wherein said **methyl** doped **silicon** **oxide** layer is formed over a metal layer.

15. A method for making a multi-layered integrated circuit structure as recited in claim 1 wherein said **methyl** doped **silicon** **oxide** layer is preferably at least about 3,000 Angstroms in thickness.

16. A method for making a multi-layered integrated circuit structure as recited in claim 15 wherein said **methyl** doped **silicon** **oxide** layer is preferably in the range of about 3,000-5,000 Angstroms in thickness.

22. A method for making a multi-layered integrated circuit structure as recited in claim 1 wherein said **methyl** doped **silicon** **oxide** has a dielectric constant in the range of about 2.0-3.5.

23. A method for making a multi-layered integrated circuit structure as recited in claim 22 wherein said **methyl** doped **silicon** **oxide** has a dielectric constant of about 2.8.

L6 ANSWER 5 OF 22 USPATFULL
AN 1999:163594 USPATFULL
TI Method of manufacturing a semiconductor device
IN Konishi, Nobuo, Yamanashi-ken, Japan
PA Tokyo Electron Limited, Tokyo, Japan (non-U.S. corporation)
PI US 6001739 19991214
AI US 1997-979658 19971126 (8)
PRAI JP 1996-332814 19961127
DT Utility
EXNAM Primary Examiner: Powell, William
LREP Oblon, Spivak, McClelland, Maier & Neustadt, P.C.
CLMN Number of Claims: 16
ECL Exemplary Claim: 1
DRWN 27 Drawing Figure(s); 6 Drawing Page(s)
LN.CNT 581
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A method of manufacturing a semiconductor device comprising the steps of forming an organic insulating film of a **low dielectric** **constant** on a surface of a silicon wafer, forming a photoresist film on the organic insulating film, exposing the photoresist film. . .

DETD Using Chemical Vapor Deposition method or spin coating method, an organic insulating film 1A of (**CH**.sub.**3** -- **SiO**.sub.2).sub.n is formed on the surface of the wafer W (Step S1), as shown in FIG. 2A. The wafer W used. . .

L6 ANSWER 6 OF 22 USPATFULL
AN 1999:160138 USPATFULL
TI Coating solution and method for preparing the coating solution, method for forming insulating films for semiconductor devices, and method for evaluating the coating solution
IN Nakano, Tadashi, Chiba, Japan
Shimura, Makoto, Chiba, Japan
Ohta, Tomohiro, Chiba, Japan
PA Kawasaki Steel Corporation, Hyogo, Japan (non-U.S. corporation)
PI US 5998522 19991207
AI US 1998-42668 19980317 (9)
RLI Continuation of Ser. No. US 545736
PRAI JP 1994-41314 19940311
DT Utility
EXNAM Primary Examiner: Marquis, Melvin I.
LREP Oliff & Berridge, PLC

CLMN Number of Claims: 18
ECL Exemplary Claim: 1
DRWN 6 Drawing Figure(s); 4 Drawing Page(s)
LN.CNT 1511
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
SUMM . . . entire pattern formed on the substrate and which permits the formation of an insulating film free of water, having a **low dielectric constant** and favorable for a high speed interconnection, i.e., an insulating film excellent in film characteristic properties, in particular, an interlayer. . .
SUMM . . . forming an insulating film used in the production of semiconductor devices, wherein a methylsiloxane oligomer represented by the chemical formula: (**CH**.sub.**3**).sub.y **SiO** .sub.2-(y/2) (in the formula, y is not less than 0.8 and not more than 1.3) and having a weight-average molecular weight. . .
DETD . . . the present invention, there is provided a coating solution characterized by dissolving a methylsiloxane oligomer represented by the
chemical formula: (**CH**.sub.**3**).sub.y **SiO** .sub.2(y/2) (in the formula, y is not less than 0.8 and not more than 1.3) and having a weight-average molecular weight. . .
DETD . . . steps formed on the substrate surface and the formation of an insulating film which is free of water, has a **low dielectric constant**, is excellent in the insulating properties and is suitably used for producing a high speed interconnection, for the reasons discussed. . .
DETD . . . the concentration is equal to the range of the value y when methylsiloxane oligomer is expressed by the chemical formula: (**CH**.sub.**3**).sub.y **SiO**.sub.2(y/2). In other words, the value y in the chemical formula should be limited to not less
than 0.8 and not. . .
DETD . . . whole starting material, the value y of the resulting methylsiloxane oligomer, when the latter is represented by the chemical formula: (**CH**.sub.**3**).sub.y **SiO**.sub.2(y/2), is less than 0.8 and therefore, the resulting coating solution cannot show the desired characteristic properties for the reasons discussed.
.

DETD (**CH**.sub.**3**).sub.y **SiO**.sub.2(y/2)
(chemical formula 1)
DETD . . . substrate, i.e., leveling the substrate surface and they permit
the formation of an insulating film free of moisture, having a **low dielectric constant** and effective for use in high speed interconnections, in particular, an interlayer insulating film for semiconductor devices.

L6 ANSWER 7 OF 22 USPATFULL
AN 1999:137375 USPATFULL
TI Vacuum dispensable silicone compositions
IN Dent, Stanton James, Midland, MI, United States
Benson, Edward Joseph, Fremont, CA, United States
Norris, Ann Walstrom, Midland, MI, United States
Lee, Yeong Joo, Midland, MI, United States
PA Dow Corning Corporation, Midland, MI, United States (U.S. corporation)
PI US 5977226 19991102
AI US 1998-72229 19980504 (9)
DT Utility
EXNAM Primary Examiner: Marquis, Melvyn I.; Assistant Examiner: Milstead, Mark
W.
LREP Milco, Larry A.
CLMN Number of Claims: 33
ECL Exemplary Claim: 1

DRWN No Drawings
LN.CNT 896
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
SUMM . . . radiological purity for RAM applications; low levels of ionic impurities (e.g., sodium, potassium, chloride); excellent electrical properties, such as a **low dielectric constant** and dissipation factor; and a low modulus, which reduces thermal stresses in the package. The compositions of the present invention. . .
SUMM A preferred organopolysiloxane resin contains (CH.sub.3).sub.2 CH.sub.2 .dbd.CHSiO.sub.1/2 siloxane units, (**CH**.sub.**3**).sub.3 Si**O**.sub.1/2 siloxane units, and SiO.sub.4/2 siloxane units, wherein the mole ratio of the combination of (CH.sub.3).sub.2 CH.sub.2 .dbd.CHSiO.sub.1/2 units and (**CH**.sub.**3**).sub.3 Si**O**.sub.1/2 units to SiO.sub.4/2 units is about 0.7, and the resin contains 1.75 to 2.3 percent by weight of vinyl groups.
DETD . . . of 434 and a viscosity of 2 Pa.multidot.s; 44.4 parts of a resin consisting essentially of (CH.sub.3).sub.2 CH.sub.2 .dbd.CHSiO.sub.1/2 units, (**CH**.sub.**3**).sub.3 Si**O**.sub.1/2 units, and SiO.sub.4/2 units, wherein the mole ratio of total triorganosiloxane units to SiO.sub.4/2 units is about 0.7:1 and the. . .
CLM What is claimed is:
. . . 1 to 100 Pa.multidot.s at 25.degree. C.; (B) is an organopolysiloxane resin consisting essentially of (CH.sub.3).sub.2 CH.sub.2 .dbd.CHSiO.sub.1/2 siloxane units, (**CH**.sub.**3**).sub.3 Si**O**.sub.1/2 siloxane units, and SiO.sub.4/2 siloxane units; (C) is a trimethylsiloxy-terminated dimethylmethylhydrogensiloxane having an average degree of polymerization of 10; (E). . .
. . . 1 to 100 Pa.multidot.s at 25.degree. C.; (B) is an organopolysiloxane resin consisting essentially of (CH.sub.3).sub.2 CH.sub.2 .dbd.CHSiO.sub.1/2 siloxane units, (**CH**.sub.**3**).sub.3 Si**O**.sub.1/2 siloxane units, and SiO.sub.4/2 siloxane units; (C) is a trimethylsiloxy-terminated dimethylmethylhydrogensiloxane having an average degree of polymerization of 10; (D). . .
. . . 1 to 100 Pa.multidot.s at 25.degree. C.; (B) is an organopolysiloxane resin consisting essentially of (CH.sub.3).sub.2 CH.sub.2 .dbd.CHSiO.sub.1/2 siloxane units, (**CH**.sub.**3**).sub.3 Si**O**.sub.1/2 siloxane units, and SiO.sub.4/2 siloxane units; (C) is a trimethylsiloxy-terminated dimethylmethylhydrogensiloxane having an average degree of polymerization of 10; (D). . .

L6 ANSWER 8 OF 22 USPATFULL
AN 1999:61046 USPATFULL
TI Method for producing low dielectric coatings from hydrogen silsequioxane resin
IN Bremmer, Jeffrey Nicholas, Midland, MI, United States
Liu, Youfan, Midland, MI, United States
PA Dow Corning Corporation, Midland, MI, United States (U.S. corporation)
PI US 5906859 19990525
AI US 1998-113347 19980710 (9)
DT Utility
EXNAM Primary Examiner: Bell, Janyce
LREP Severance, Sharon K.
CLMN Number of Claims: 10
ECL Exemplary Claim: 1
DRWN No Drawings
LN.CNT 424
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB . . . 450.degree. C. until the normalized SiH bond density is 50 to

80%. This two step curing process produces films having **lower dielectric constant** and improved mechanical properties.

SUMM . . . 450.degree. C. until the normalized SiH bond density is 50 to 80%. This two step curing process produces films having **lower dielectric constant** and improved mechanical properties.

SUMM Coatings having a dielectric constant of 2.9-3.0 are suitable for 0.25 micron and larger electronic devices. However, coatings having **lower dielectric constants** (Dk) are required for smaller device structures (i.e. 0.13-0.18 micron). Several methods have been proposed for curing the hydrogen silsesquioxane resin to produce a **lower dielectric constant** in the coating. However, these methods often require difficult and expensive processing to produce the low Dk coatings. For example, . . .

SUMM . . . atoms which have either 0 or 2 hydrogen atoms attached thereto and/or a small number of SiC groups such as **CH**.sub.3 **SiO**.sub.3/2 or HCH.sub.3 SiO.sub.2/2 groups.

SUMM . . . in the coatings. The two step heating of the instant invention results in both the improved mechanical properties and the **low dielectric constant**. The insoluble coatings produced herein have a Dk of 2.9 or less, preferably 2.7 to 2.9.

L6 ANSWER 9 OF 22 USPATFULL
AN 1999:27155 USPATFULL
TI Process for making inorganic oxide gels in fluorocarbon solvents
IN Michalczyk, Michael Joseph, Wilmington, DE, United States
Sharp, Kenneth George, Landenburg, PA, United States
PA E. I. du Pont de Nemours and Company, Wilmington, DE, United States (U.S. corporation)
PI US 5876686 19990302
AI US 1996-663833 19960614 (8)
PRAI US 1995-576 19950628 (60)
DT Utility
EXNAM Primary Examiner: Bos, Steven
CLMN Number of Claims: 15
ECL Exemplary Claim: 1
DRWN No Drawings
LN.CNT 1519
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

SUMM . . . Si, Sn, Ti or Zr atoms. Clear network wet gels made by the process of the present invention can display **low dielectric constants** and **low** refractive indexes. The process of the present invention can be used to prepare low energy surface coatings and primers for. . .

CLM What is claimed is:
. . . . Si(OCH.sub.2 C.sub.3 F.sub.7).sub.3).sub.4 ; Si(CH.sub.2 CH.sub.2 Si(OCH.sub.2 CF.sub.3).sub.3).sub.4 ; Si(CH.sub.2 CH.sub.2 Si(OCH.sub.2 C.sub.3 F.sub.7).sub.3).sub.4 ; (CH.sub.3 (CF.sub.3 CH.sub.2 O).sub.3 SiCH.sub.2 CH.sub.2)**SiO**).sub.4 ; (**CH**.sub.3 ((C.sub.3 F.sub.7 CH.sub.2 O).sub.3 SiCH.sub.2 CH.sub.2)SiO).sub.4 ; (C.sub.3 F.sub.7 CH.sub.2 O).sub.3 Si(CH.sub.2).sub.2 (CF.sub.2).sub.6 (CH.sub.2).sub.2 Si(OCH.sub.2 C.sub.3 F.sub.7).sub.3 ; (CF.sub.2).sub.6 [(CH.sub.2).sub.2. . .

L6 ANSWER 10 OF 22 USPATFULL
AN 1998:147534 USPATFULL
TI Coating solution and method for preparing the coating solution, method for forming insulating films for semiconductor devices, and method for evaluating the coating solution
IN Nakano, Tadashi, Chiba, Japan
Shimura, Makoto, Chiab, Japan
Ohta, Tomohiro, Chiba, Japan
PA Kawasaki Steel Corporation, Hyogo, Japan (non-U.S. corporation)

PI US 5840821 19981124
WO 9524639 19950914
AI US 1995-545736 19951121 (8)
WO 1994-JP1910 19941111
19951121 PCT 371 date
19951121 PCT 102(e) date
PRAI JP 1994-41314 19940311
DT Utility
EXNAM Primary Examiner: Marquis, Melvyn I.
LREP Oliff & Berridge, P.L.C.
CLMN Number of Claims: 32
ECL Exemplary Claim: 1
DRWN 6 Drawing Figure(s); 4 Drawing Page(s)
LN.CNT 1592
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

SUMM . . . entire pattern formed on the substrate and which permits the formation of an insulating film free of water, having a **low dielectric constant** and favorable for a high speed interconnection, i.e., an insulating film excellent in film characteristic properties, in particular, an interlayer. . .

SUMM . . . forming an insulating film used in the production of semiconductor devices, wherein a methylsiloxane oligomer represented by the chemical formula: (**CH**.sub.**3**).sub.y **SiO** .sub.2-(y/2) (in the formula, y is not less than 0.8 and not more than 1.3) and having a weight-average molecular weight. . .

DETD . . . the present invention, there is provided a coating solution characterized by dissolving a methylsiloxane oligomer represented by the chemical formula: (**CH**.sub.**3**).sub.y **SiO** .sub.2-(y/2) (in the formula, y is not less than 0.8 and not more than 1.3) and having a weight-average molecular weight. . .

DETD . . . steps formed on the substrate surface and the formation of an insulating film which is free of water, has a **low dielectric constant**, is excellent in the insulating properties and is suitably used for producing a high speed interconnection, for the reasons discussed. . .

DETD . . . the concentration is equal to the range of the value y when methylsiloxane oligomer is expressed by the chemical formula: (**CH**.sub.**3**).sub.y **SiO**.sub.2-(y/2). In other words, the value y in the chemical formula should be limited to not less than 0.8 and not. . .

DETD . . . whole starting material, the value y of the resulting methylsiloxane oligomer, when the latter is represented by the chemical formula: (**CH**.sub.**3**).sub.y **SiO**.sub.2-(y/2), is less than 0.8 and therefore, the resulting coating solution cannot show the desired characteristic properties for the reasons discussed.

.

.

DETD (**CH**.sub.**3**).sub.y **SiO**.sub.2-(y/2)
(chemical formula 1)

DETD . . . substrate, i.e., leveling the substrate surface and they permit the formation of an insulating film free of moisture, having a **low dielectric constant** and effective for use in high speed interconnections, in particular, an interlayer insulating film for semiconductor devices.

L6 ANSWER 11 OF 22 USPATFULL
AN 1998:122017 USPATFULL
TI Display and method for producing it
IN Tanaka, Akira, Kawasaki, Japan
Hattori, Tetsuo, Yokohama, Japan
Toki, Motoyuki, Kyoto, Japan
PA Nikon Corporation, Tokyo, Japan (non-U.S. corporation)

PI   US 5817255 19981006
AI   US 1996-705525 19960829 (8)
PRAI   JP 1995-222225   19950830
        JP 1996-179695   19960709
DT   Utility
EXNAM   Primary Examiner: Kelly, C. H.
LREP   Shapiro and Shapiro
CLMN   Number of Claims: 38
ECL   Exemplary Claim: 1
DRWN   5 Drawing Figure(s); 3 Drawing Page(s)
LN.CNT 837
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

SUMM   . . . constant of which has been adjusted by mixing the aforementioned dielectric gel or dielectric material with a material having a **low dielectric constant** such as silica produced by a sol-gel method; or iii) a material the dielectric constant of which has been adjusted. . . .

DETD   (Preparation of silica sol 2 (**CH**.sub.**3** **SiO**.sub.1.5 sol))

DETD   . . . silicon (Si(OEt).sub.3 Me). Water is added dropwise to this solution to obtain a hydroxide. In this manner, silica sol 2 (**CH**.sub.**3** **SiO**.sub.1.5 sol) is prepared.

DETD   As stated above, when both of the high dielectric constant material, such as barium titanate sol, and the **low dielectric constant** matrix material, such as silica sol, are prepared by the sol-gel method using alkoxide or the like as a sol. . .

DETD   (Preparation of silica sol 2 (**CH**.sub.**3** **SiO**.sub.1.5 sol))

DETD   . . . monomethyl tetraethoxide (Si(OC.sub.2 H.sub.5).sub.3 CH.sub.3) as a solvent, and 54 g of water was added dropwise to this solution, obtaining **CH**.sub.**3** **SiO**.sub.1.5 sol. The solid content of this sol was 14.2 wt %, and after gelation and solidification of this sol, the. . .

DETD   . . . was mixed with 13 g of barium titanate sol prepared in Example 2, preparing a sol mixture. The ratio of **CH**.sub.**3** **SiO**.sub.1.5 to BaTiO.sub.3 as the solid content was 0.740:0.260, the solid content was 5.5 wt %, and after gelation and solidification. . .

DETD   . . . g of barium titanate sol prepared in Example 2 were mixed together, preparing a sol mixture 3. The ratio of **SiO**.sub.2. **CH**.sub.**3** **SiO**.sub.1.5 :BaTiO.sub.3 as the solid content was 0.376:0.376:0.247, the solid content was 5.5%, and after gelation and solidification, the refractive index. . .

L6   ANSWER 12 OF 22 USPATFULL
AN   1998:30512 USPATFULL
TI   Opaque ceramic coatings
IN   Camilletti, Robert Charles, Midland, MI, United States
        Haluska, Loren Andrew, Midland, MI, United States
        Michael, Keith Winton, Midland, MI, United States
PA   Dow Corning Corporation, Midland, MI, United States (U.S. corporation)
PI   US 5730792 19980324
AI   US 1996-725791 19961004 (8)
DT   Utility
EXNAM   Primary Examiner: Brunsman, David
LREP   Severance, Sharon K.
CLMN   Number of Claims: 23
ECL   Exemplary Claim: 1,16
DRWN   No Drawings
LN.CNT 668
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

DETD   . . . from that described in the '997 patent (Clark), is that in our invention, at 400.degree. C. the methyl groups on **CH**.sub.**3** **SiO**.sub.3/2 are oxidized to form SiO.sub.2. The oxidation may not be complete, however, due to the thickness of the

coating composition, . . .

DETD . . . be used as an interlayer dielectric, a material such as alumina is desirable, so that the coating will have a **low dielectric constant** (DK). If a coating having a high DK is desired, a material such as barium titanate or lead niobate should. . .

L6 ANSWER 13 OF 22 USPATFULL

AN 1998:25301 USPATFULL

TI Fluoropolymer nanocomposites

IN Michalczyk, Michael Joseph, Wilmington, DE, United States
Sharp, Kenneth George, Landenburg, PA, United States
Stewart, Charles Winfield, Newark, DE, United States

PA E. I. du Pont de Nemours and Company, Wilmington, DE, United States (U.S. corporation)

PI US 5726247 19980310

AI US 1996-663821 19960614 (8)

PRAI US 1995-571 19950628 (60)
US 1995-2054 19950809 (60)

DT Utility

EXNAM Primary Examiner: Dean, Ralph H.

CLMN Number of Claims: 40

ECL Exemplary Claim: 1

DRWN 5 Drawing Figure(s); 4 Drawing Page(s)

LN.CNT 2854

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

DETD The standalone fluoropolymer nanocomposite coatings of the present invention are useful for coating articles requiring anti-fouling, durability, anti-reflective, **low dielectric constant**, abrasion resistant, chemical resistant, lubricity, release, anti-soiling, anti-staining or reduced surface energy characteristics. These articles can be made of glass;. . .

DETD . . . useful for coating articles requiring, for example, abrasion resistant or scratch resistant, anti-reflective, anti-fouling, chemical resistant, release, lubricity, anti-soiling, anti-staining, **low dielectric constant** or reduced surface energy characteristics. These articles can be made of glass, ceramic, amorphous or crystalline plastic, rubber, elastomer, wood. . .

CLM What is claimed is:
. . . C.sub.3 F.sub.7).sub.3).sub.4 ; Si(CH.sub.2 CH.sub.2 Si(OCH.sub.2 CF.sub.3).sub.4 ; Si(CH.sub.2 CH.sub.2 Si(OCH.sub.2 C.sub.3 F.sub.7).sub.3).sub.4 ; (CH.sub.3 ((CCF.sub.3 CH.sub.2 O).sub.3 SiCH.sub.2 CH.sub.2 **SiO**).sub.4 ; (**CH**.sub.3 ((C.sub.3 F.sub.7 CH.sub.2 O).sub.3 SiCH.sub.2 CH.sub.2)SiO).sub.4 ; (C.sub.3 F.sub.7 CH.sub.2 O).sub.3 Si(CH.sub.2).sub.2 (CF.sub.2).sub.6 (CH.sub.2).sub.2 Si(OCH.sub.2 C.sub.3 F.sub.7).sub.3 ; (CF.sub.2).sub.6 [(CH.sub.2).sub.2. . .

L6 ANSWER 14 OF 22 USPATFULL

AN 97:91264 USPATFULL

TI Deposited multi-layer device

IN Yamada, Katsuyuki, Mishima, Japan

PA Ricoh Company, Ltd., Tokyo, Japan (non-U.S. corporation)

PI US 5674599 19971007

AI US 1996-584289 19960111 (8)

RLI Continuation of Ser. No. US 1993-57900, filed on 7 May 1993, now abandoned

PRAI JP 1992-148124 19920514

DT Utility

EXNAM Primary Examiner: Turner, Archene

LREP Oblon, Spivak, McClelland, Maier & Neustadt, P.C.

CLMN Number of Claims: 10

ECL Exemplary Claim: 1

DRWN 8 Drawing Figure(s); 4 Drawing Page(s)
LN.CNT 798
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
SUMM . . . extremely fine processing technique is not required, therefore advantageous to an enlargement of an area of the device, and the **low dielectric constant** allows to realize a ~~high-steepness, and to obtain a ratio of Ion/Ioff, so that the MIM~~ device can be. . .

DETD . . . -80

13	PCVD	DLC	1400	-500	-70
14	PCVD	DLC	850	-600	-50
15	PCVD	DLC	2800	-800	-220
16	Sol. Gel + P	**SiO**.sub.2.**CH**.sub.**3**	8000	+100	+80

L6 ANSWER 15 OF 22 USPATFULL
AN 96:80332 USPATFULL
TI Processable silicone composite materials having high temperature resistance
IN Beckley, Don A., Newport Beach, CA, United States
Stites, John, Huntington Beach, CA, United States
PA Hitco Technologies Inc., Gardena, CA, United States (U.S. corporation)
PI US 5552466 19960903
AI US 1994-356559 19941215 (8)
RLI Continuation-in-part of Ser. No. US 1993-169505, filed on 17 Dec 1993, now abandoned
DT Utility
EXNAM Primary Examiner: Marquis, Melvyn I.
LREP Renner, Kenner, Greive, Bobak, Taylor & Weber
CLMN Number of Claims: 50
ECL Exemplary Claim: 1
DRWN No Drawings
LN.CNT 1157
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
DETD HO(**CH**.sub.**3**).sub.2 **SiO**--[--Si(**CH**.sub.**3**).sub.2 O--]--.sub.n Si(CH.sub.3).sub.2 OH
DETD (**CH**.sub.**3**).sub.3 **SiO**--[--Si(**CH**.sub.**3**).sub.2 --O--]--.sub.n Si(CH.sub.3).sub.3
DETD . . . antenna assembly of radar sets from the high temperatures experienced in flight. Radomes need to have high temperature capability, have **low dielectric constants** which are stable throughout the operational temperature range, and be insulators. For vehicles travelling at high speeds, radome temperatures can. . .

DETD As briefly discussed above, the processability, high temperature properties, and **low dielectric constant** make the invention materials favorable for several applications requiring such electrical properties. For example, the mechanical, physical, thermal and electrical. . .

L6 ANSWER 16 OF 22 USPATFULL
AN 95:73707 USPATFULL
TI Rhodium containing catalysts for the synthesis of epoxysiloxane/epoxysilicone monomers and polymers
IN Crivello, James V., Clifton Park, NY, United States
Fan, Mingxin, Troy, NY, United States
PA General Electric Company, Waterford, NY, United States (U.S. corporation)
PI US 5442026 19950815
AI US 1994-337593 19941110 (8)
RLI Division of Ser. No. US 1992-896950, filed on 11 Jun 1992, now patented,

Pat. No. US 5387698
DT Utility
EXNAM Primary Examiner: Sellers, Robert E.
CLMN Number of Claims: 2
ECL Exemplary Claim: 1
DRWN No Drawings
LN.CNT 683
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
DETD Representative examples of suitable linear SiH-containing compounds include 1,1,3,3-tetraalkyldisiloxane, dialkylhydrogensiloxy-endstopped polydialkylsiloxane, copolymer comprising at least two alkylhydrogensiloxane groups, (e.g., (**CH**.sub.**3**
).sub.2 (H)**SiO**[(**CH**.sub.**3**).sub.2
SiO].sub.x [(**CH**.sub.**3**) (H) **SiO**
].sub.y -Si(H)(CH.sub.3).sub.2, where x and y are greater than or equal to 1) . Other examples of SiH-containing compounds useful. . .
DETD (CH.sub.3).sub.2 HSiO[(CF.sub.3 CH.sub.2 CH.sub.2) (**CH**.sub.
3) **SiO**].sub.m -[(**CH**.sub.**3**).sub.2
SiO].sub.n -Si(H) (CH.sub.3).sub.2
DETD . . . the reaction medium and can be used particularly in cases in which the substrate is a poor solvent with a **low**
dielectric constant. Lastly, the catalysts of the present invention are less expensive than traditional hydrosilation catalysts such as Wilkinson's catalyst. This is. . .

L6 ANSWER 17 OF 22 USPATFULL
AN 95:70997 USPATFULL
TI Method for producing and using crosslinked copolyesters
IN Economy, James, Urbana, IL, United States
PA The Board of Trustees of the University of Illinois, Urbana, IL, United States (U.S. corporation)
PI US 5439541 19950808
AI US 1994-193561 19940208 (8)
DT Utility
EXNAM Primary Examiner: Gallagher, John J.
LREP Dressler, Goldsmith, Shore & Milnamow, Ltd.
CLMN Number of Claims: 6
ECL Exemplary Claim: 1
DRWN 7 Drawing Figure(s); 4 Drawing Page(s)
LN.CNT 829
SUMM . . . continuous use temperatures in air of 350.degree. C., inertness
to moisture, high strength and modulus values, outstanding dimensional stability, and **low dielectric constants**,
crosslinked polyesters were not considered for use in adhesives, composites, rigid foams, protective coatings and as dielectrics because of various. . .
DRWD . . . layer between stacked circuits with a connection between the various stacked circuits. Dielectric layers comprised of crosslinked copolyesters can have **dielectric constants** as
low as 3.0 and may approach 1 if the dielectric layer is in the form of a foam, which may be. . .
CLM What is claimed is:
. . . end groups are selected from the group consisting of CH.sub.3 CO.sub.2 --, C.sub.2 H.sub.5 CO.sub.2 --, C.sub.6 H.sub.5 CO.sub.2 --,
(
CH.sub.**3**).sub.3 **SiO**-- and **CH**.sub.
3 OCO.sub.2 --.

L6 ANSWER 18 OF 22 USPATFULL
AN 95:11713 USPATFULL
TI Rhodium containing selective catalysts for the synthesis of epoxysiloxane/epoxysilicone monomers and polymers
IN Crivello, James V., Clifton Park, NY, United States

Fan, Mingxin, Troy, NY, United States
PA General Electric Company, Waterford, NY, United States (U.S. corporation)
PI US 5387698 19950207
AI US 1992-896950 19920611 (7)
DCD 20091208
DT ~~Utility~~
EXNAM Primary Examiner: Ivy, C. Warren; Assistant Examiner: Trinh, Ba K.
CLMN Number of Claims: 9
ECL Exemplary Claim: 1
DRWN No Drawings
LN.CNT 725
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
SUMM Representative examples of suitable linear SiH-containing compounds include 1,1,3,3-tetraalkyldisiloxane, dialkylhydrogensiloxy-endstopped polydialkylsiloxane, copolymer comprising at least two alkylhydrogensiloxane groups, (e.g., (**CH**.sub.**3**).sub.2 (H)**SiO**[(**CH**.sub.**3**).sub.2 **SiO**].sub.x [(**CH**.sub.**3**)(H)**SiO**].sub.y --Si(H)(CH.sub.3).sub.2, where x and y are greater than or equal to 1). Other examples of SiH-containing compounds useful in the. . .

SUMM (CH.sub.3).sub.2 HSiO[(CF.sub.3 CH.sub.2 CH.sub.2)(**CH**.sub.**3**)**SiO**].sub.m --[(**CH**.sub.**3**).sub.2 **SiO**].sub.n --Si(H)(CH.sub.3).sub.2
SUMM . . . the reaction medium and can be used particularly in cases in which the substrate is a poor solvent with a **low dielectric constant**. Lastly, the catalysts of the present invention are less expensive than traditional hydrosilation catalysts such as Wilkinson's catalyst. This is. . .

L6 ANSWER 19 OF 22 USPATFULL
AN 94:59810 USPATFULL
TI Wafer fabrication
IN Matlow, Sheldon L., San Jose, CA, United States
PA Nace Technology, Inc., San Jose, CA, United States (U.S. corporation)
PI US 5328556 19940712
AI US 1992-999209 19921231 (7)
DT Utility
EXNAM Primary Examiner: Powell, William A.
LREP Fliesler, Dubb, Meyer & Lovejoy
CLMN Number of Claims: 34
ECL Exemplary Claim: 13
DRWN 2 Drawing Figure(s); 2 Drawing Page(s)
LN.CNT 7575
DETD Fluorocarbons play a key role in the deposition of **low dielectric constant** dielectrics. The vaporization reagent of choice here is monohydrogen. As a demonstration of the efficacy of monohydrogen in the breaking. . .
DETD . . . mol.sup.-1 ,
[II-176]
Si(cr) + 4CH.sub.3 (g) .fwdarw. (CH.sub.3).sub.4 Si(g)
0 4 .times. 146
-245, .DELTA.H.sub.r.sup.0 (298 K.) = -829 kJ mol.sup.-1,
[II-177]
SiO.sub.2 (cr) + **CH**.sub.**3** (g) .fwdarw. **SiO**(g) + **CH**.sub.**3** O(g)
-911 146 -100 18, .DELTA.H.sub.r.sup.0 (298 K.) = +683 kJ mol.sup.-1,
[II-178]
SiO.sub.2 (cr) + 2CH.sub.3 (g) .fwdarw. **SiO**(g) + (**CH**.sub.**3**).sub.2 O(g)

-911 2 .times. 146
-100 -184, .DELTA.H.sub.r.sup.0 (298 K.) = +335 kJ
mol.sup.-1,
[II-179]
SiO.sub.2 (cr) + 3CH.sub.3 (g) .fwdarw. Si(cr). . .
DETD . . . thermodynamic data on (CH.sub.3).sub.x Si for x=1, 2, 3
definitive statements cannot be made with respect to the reactions of
methyl with silicon or **silicon dioxide**. It
is clear, however, that between four and eight methyls per silicon
dioxide are required to yield a volatile silicon. . .

L6 ANSWER 20 OF 22 JAPIO COPYRIGHT 2000 JPO
AN 1999-111714 JAPIO
TI MANUFACTURE OF SILICON INSULATING FILM
IN UCHIDA TADATAKA
PA JAPAN SCIENCE & TECHNOLOGY CORP, JP (CO)
PI JP 11111714 A 19990423 Heisei
AI JP1997-270732 (JP09270732 Heisei) 19971003
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 99, No. 4
AB PURPOSE: TO BE SOLVED:To form a silicon insulating film having oxygen-resistant plasma property and hygroscopicity and having a **low dielectric constant** at a **low** temperature, by introducing a mixed gas or a liquid containing a cyanate-group- and alkyl-group-having silicon material and a tertiary amine. . . vapor of the alkyl isocyanate at atmospheric pressure or a reduced pressure, thereby thermally decomposing them and hence depositing a **silicon dioxide** film containing a **methyl** group on a substrate 5 at a low deposition temperature of about 100.degree.C. A silicon insulating film having oxygen-resistant plasma.

2

A

L6 ANSWER 21 OF 22 CA COPYRIGHT 2000 ACS
AN 131:95851 CA
TI A fluorinated organic-silica film with extremely **low dielectric constant**
AU Uchida, Yasutaka; Taguchi, Kohshi; Sugahara, Satoshi; Matsumura, Masakiyo
CS Teikyo University of Science and Technology, Yamanashi, 409-0193, Japan
SO Jpn. J. Appl. Phys., Part 1 (1999), 38(4B), 2368-2372
CODEN: JAPNDE; ISSN: 0021-4922
PB Japanese Journal of Applied Physics
DT Journal
LA English
TI A fluorinated organic-silica film with extremely **low dielectric constant**
ST **methyl silicon** fluoride **oxide** dielec film
CVD

2

L6 ANSWER 22 OF 22 EUROPATFULL COPYRIGHT 2000 WILA

PATENT APPLICATION - PATENTANMELDUNG - DEMANDE DE BREVET

AN 960958 EUROPATFULL ED 19991212 EW 199948 FS OS
TIEN Method for producing hydrogenated silicon oxycarbide films.
TIDE Verfahren zur Herstellung von hydriertem Silizium-Oxy-Karbid.
TIFR Procede pour la preparation de silicium-oxy-carbure hydrogene.
IN Loboda, Mark Jon, 1902 Vine Street, Midland, Michigan 48640, US; Seifferly, Jeffrey Alan, 3007 Linden Park Drive, Bay City, Michigan 48706, US
PA DOW CORNING CORPORATION, 3901 S. Saginaw Road, Midland Michigan 48686-0994, US
PAN 275274
AG Patentanwaelte Sternagel & Fleischer, Braunsberger Feld 29, 51429 Bergisch Gladbach, DE

AGN 101441
OS ESP1999088 EP 0960958 A2 991201
SO Wila-EPZ-1999-H48-T1a
DT Patent
LA Anmeldung in Englisch; Veroeffentlichung in Englisch
DS R AT; R BE; R CH; R CY; R DE; R DK; R ES; R FI; R FR; R GB; R GR; R IE; R IT; R LI; R LU; R MC; R NL; R PT; R SE; R AL; R LT; R LV; R MK; R RO; R SI
PIT EPA2 EUROPAEISCHE PATENTANMELDUNG
PI EP 960958 A2 19991201
OD 19991201
AI EP 1999-110260 19990527
PRAI US 1998-86811 19980529

ABEN This invention is a method for producing hydrogenated silicon oxycarbide (H:SiOC) films having a **low dielectric constant**. This method comprises reacting an methyl-containing silane in a controlled oxygen environment using plasma enhanced or ozone assisted chemical vapor. . .

DETDEN. . . have high dielectric constants (i.e. 3.8 or greater). Therefore there is a need for processes and materials that result in **low dielectric constant** films. A new deposition processes known as Low-k Flowfill.reg., produces films having a dielectric constant of <3.0. This method uses a chemical vapor deposition reaction between methylsilane and hydrogen peroxide to produce a **methyl** doped **silicon oxide** film (See S. McClatchie, K. Beekmann, A. Kiermasz; **Low Dielectric Constant** Oxide Films Deposited Using CVD Techniques, 1988 DUMIC Conference Proceedings, 2/98, p. 311-318). However, this process requires a non standard. . .

An object of this invention is to provide a method for producing **low dielectric constant** thin films of hydrogenated silicon oxycarbide by chemical vapor deposition.

This invention pertains to a method of producing thin films of hydrogenated silicon oxycarbide (H:SiOC) having **low dielectric constants** on substrates, preferably semiconductor devices. The method comprises the plasma enhanced or ozone enhanced chemical vapor deposition of a reaction. . .

The films produced, due to the **low dielectric constant**, are particularly suited as interlayer dielectrics in semiconductor integrated circuit manufacturing such as gate dielectrics, premetal and intermetal dielectrics and. . .

L14 ANSWER 2 OF 10 USPATFULL
AN 1999:163594 USPATFULL
TI Method of manufacturing a semiconductor device
IN Konishi, Nobuo, Yamanashi-ken, Japan
PA Tokyo Electron Limited, Tokyo, Japan (non-U.S. corporation)
PI US 6001739 19991214
AI US 1997-979658 19971126 (8)
PRAI JP 1996-332814 19961127
DT Utility
EXNAM Primary Examiner: Powell, William
LREP Oblon, Spivak, McClelland, Maier & Neustadt, P.C.
CLMN Number of Claims: 16
ECL Exemplary Claim: 1
DRWN 27 Drawing Figure(s); 6 Drawing Page(s)
LN.CNT 581
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A method of manufacturing a semiconductor device comprising the steps of forming an organic insulating film of a **low dielectric constant** on a surface of a silicon wafer, forming a photoresist film on the organic insulating film, exposing the photoresist film. . . .

DETD Using Chemical Vapor Deposition method or spin coating method, an organic insulating film 1A of (**CH**.sub.**3** --**SiO**.sub.2).sub.n is formed on the surface of the wafer W (Step S1), as shown in FIG. 2A. The wafer W used. . .

DETD The wafer W is then loaded into the dry developing chamber 14 and then an **oxygen** gas **plasma** is generated. **Oxygen** radicals generated from the **oxygen** gas **plasma** thus obtained are allowed to react with a photoresist film of the wafer. In this manner, the photoresist film 2A. . .

DETD FIG. 6 is a graph showing the **oxygen-plasma** etching amount of the photoresist film having a cured surface layer 2H according to the present invention by comparison with. . .

DETD . . . figure, the photoresist film of the comparable embodiment is removed in a thickness of 100 to 102 nm during 60-second **oxygen-plasma** etching, whereas the photoresist film having a cured surface layer portion 2H of the present invention is removed only in. . .

DETD Thereafter, the wafer W is loaded in a dry etching device having plate electrodes arranged in parallel. The **oxygen** gas **plasma** is generated between the electrodes, thereby applying a reactive ion etching due to oxygen radicals onto the insulating film 1.. . .

L14 ANSWER 3 OF 10 USPATFULL
AN 1998:30512 USPATFULL
TI Opaque ceramic coatings
IN Camilletti, Robert Charles, Midland, MI, United States
Haluska, Loren Andrew, Midland, MI, United States
Michael, Keith Winton, Midland, MI, United States
PA Dow Corning Corporation, Midland, MI, United States (U.S. corporation)
PI US 5730792 19980324
AI US 1996-725791 19961004 (8)
DT Utility
EXNAM Primary Examiner: Brunsman, David
LREP Severance, Sharon K.

CLMN   Number of Claims: 23
ECL   Exemplary Claim: 1,16
DRWN   No Drawings
LN.CNT 668
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
DETD   . . . from that described in the '997 patent (Clark), is that in our invention, at 400.degree. C. the methyl groups on **CH**.sub. 3 **SiO**.sub.3/2 are oxidized to form SiO.sub.2. The oxidation may not be complete, however, due to the thickness of the coating composition, . . .
DETD   . . . be used as an interlayer dielectric, a material such as alumina is desirable, so that the coating will have a **low dielectric constant** (DK). If a coating having a high DK is desired, a material such as barium titanate or lead niobate should. . .
CLM   What is claimed is:
. . . wherein the coated surface of the electronic device is pyrolyzed in an environment selected from the group consisting of air, **oxygen**, **oxygen plasma**, an inert gas, ammonia, an amine, moisture, and nitrous oxide.

L14 ANSWER 4 OF 10 USPATFULL
AN   1998:25301 USPATFULL
TI   Fluoropolymer nanocomposites
IN   Michalczyk, Michael Joseph, Wilmington, DE, United States
        Sharp, Kenneth George, Landenburg, PA, United States
        Stewart, Charles Winfield, Newark, DE, United States
PA   E. I. du Pont de Nemours and Company, Wilmington, DE, United States (U.S. corporation)
PI   US 5726247 19980310
AI   US 1996-663821 19960614 (8)
PRAI   US 1995-571   19950628 (60)
        US 1995-2054   19950809 (60)
DT   Utility
EXNAM   Primary Examiner: Dean, Ralph H.
CLMN   Number of Claims: 40
ECL   Exemplary Claim: 1
DRWN   5 Drawing Figure(s); 4 Drawing Page(s)
LN.CNT 2854
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
DETD   The standalone fluoropolymer nanocomposite coatings of the present invention are useful for coating articles requiring anti-fouling, durability, anti-reflective, **low dielectric constant**, abrasion resistant, chemical resistant, lubricity, release, anti-soiling, anti-staining or reduced surface energy characteristics. These articles can be made of glass; . . .
DETD   . . . useful for coating articles requiring, for example, abrasion resistant or scratch resistant, anti-reflective, anti-fouling, chemical resistant, release, lubricity, anti-soiling, anti-staining, **low dielectric constant** or reduced surface energy characteristics. These articles can be made of glass, ceramic, amorphous or crystalline plastic, rubber, elastomer, wood. . .
DETD   . . . 199-229). Vinylpolyfluoroalkanes; trans-divinylperfluoro-1,3-dioxolanes; all of the "TEFLON" AF, "TEFLON" FEP, and "KALREZ" fluoropolymers; zirconia, crystalline Nylon 6,6; "NOMEX" aramid paper, **oxygen plasma**-treated "MYLAR" polyester film; "KAPTON" polyimide film; silicone rubber; "NORDEL" rubber, "VAMAC" elastomer, or "VITON" elastomer, polymethylmethacrylate; copper and brass were. . .
DETD   A piece of **oxygen plasma**-treated "MYLAR" polyester film (22.5 mm.times.77 mm.times.0.023 mm) was dipcoated using the solution described in Example 31. The sample was air. . .
DETD   A piece of **oxygen plasma**-treated "MYLAR" polyester

film (22.5 mm.times.77 mm.times.0.023 mm) was dipcoated using the solution described in Example 32. The sample was air. . .

CLM What is claimed is:
. . . C.sub.3 F.sub.7).sub.3).sub.4 ; Si(CH.sub.2 CH.sub.2 Si(OCH.sub.2 CF.sub.3).sub.4 ; Si(CH.sub.2 CH.sub.2 Si(OCH.sub.2 C.sub.3 F.sub.7).sub.3).sub.4 ; (CH.sub.3 ((CCF.sub.3 CH.sub.2 O).sub.3 SiCH.sub.2 CH.sub.2 **SiO**).sub.4 ; (CH.sub.3 ((C.sub.3 F.sub.7 CH.sub.2 O).sub.3 SiCH.sub.2 CH.sub.2)SiO).sub.4 ; (C.sub.3 F.sub.7 CH.sub.2 O).sub.3 Si(CH.sub.2).sub.2 (CF.sub.2).sub.6 (CH.sub.2).sub.2 Si(OCH.sub.2 C.sub.3 F.sub.7).sub.3 ; (CF.sub.2).sub.6 [(CH.sub.2).sub.2. . .

L14 ANSWER 5 OF 10 USPATFULL
AN 97:9818 USPATFULL
TI Adhesive layer in multi-level packaging and organic material as a metal diffusion barrier
IN Adamopoulos, Eleftherios, Bronx, NY, United States
Kim, Jungihl, Seoul, Korea, Republic of
Lee, Kang-Wook, Yorktown Heights, NY, United States
Oh, Tae S., Seoul, Korea, Republic of
O'Toole, Terrence R., Hopewell Junction, NY, United States
Purushothaman, Sampath, Yorktown Heights, NY, United States
Ritsko, John J., Mount Kisco, NY, United States
Shaw, Jane M., Ridgefield, CT, United States
Viehbeck, Alfred, Stormville, NY, United States
Walker, George F., New York, NY, United States
PA International Business Machines Corporation, Armonk, NY, United States (U.S. corporation)
PI US 5599582 19970204
AI US 1995-475412 19950607 (8)
RLI Division of Ser. No. US 1994-197941, filed on 17 Feb 1994 which is a division of Ser. No. US 1991-771929, filed on 7 Oct 1991, now patented, Pat. No. US 5326643
DT Utility
EXNAM Primary Examiner: Beck, Shrive; Assistant Examiner: Cameron, Erma
LREP Scully, Scott, Murphy & Presser
CLMN Number of Claims: 10
ECL Exemplary Claim: 1
DRWN 6 Drawing Figure(s); 5 Drawing Page(s)
LN.CNT 1009
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
SUMM . . . dielectric layers in electronic packaging, especially multilevel packaging. Polyimides are especially suitable in these applications since they have good processability, **low dielectric constant**, high thermal stability, low moisture absorption, good mechanical properties and the like.
DETD The preferred silane coupling agents contain an Si--O-alkyl group such as **SiOC**.sub.2 H.sub.5 by which it is intended that such silane coupling agents contain up to about three Si--O-alkyl groups.
DETD . . . PMDA-ODA to THERMID adhesion was 68 g/mm. In another experiment the THERMID 6015, after curing, was down-streamed ashed with Plasmatech **plasma** equipment using **oxygen** and nitroso oxide gases followed by spin coating a non-acid precursor of PMDA-ODA polyimide at a thickness of 20 .mu.m. . .
DETD In other embodiments, the glass ceramic substrate previously described was similarly ashed by means of an **oxygen plasma** and a silane coupling agent applied which was baked at 85.degree. C. for thirty minutes after which a thin layer. . .

L14 ANSWER 6 OF 10 USPATFULL
AN 96:113664 USPATFULL
TI Adhesive layer in multi-level packaging and organic material as a metal diffusion barrier

IN Adamopoulos, Eleftherios, Bronx, NY, United States
Kim, Jungihl, Seoul, Korea, Republic of
Lee, Kang-Wook, Yorktown Heights, NY, United States
Oh, Tae S., Seoul, Korea, Republic of
O'Toole, Terrence R., Hopewell Junction, NY, United States
Purushothaman, Sampath, Yorktown Heights, NY, United States
Ritsko, John J., Mount Kisco, NY, United States
Shaw, Jane M., Ridgefield, CT, United States
Viehbeck, Alfred, Stormville, NY, United States
Walker, George F., New York, NY, United States
PA International Business Machines Corporation, Armonk, NY, United States (U.S. corporation)
PI US 5582858 19961210
AI US 1995-474985 19950607 (8)
RLI Division of Ser. No. US 1994-197941, filed on 17 Feb 1994 76 Ser. No. US
1991-771929, filed on 7 Oct 1991, now patented, Pat. No. US 5326643
DT Utility
EXNAM Primary Examiner: Beck, Shrive; Assistant Examiner: Cameron, Erma
LREP Scully, Scott, Murphy & Presser
CLMN Number of Claims: 14
ECL Exemplary Claim: 1
DRWN 6 Drawing Figure(s); 5 Drawing Page(s)
LN.CNT 1042
SUMM . . . dielectric layers in electronic packaging, especially multilevel packaging. Polyimides are especially suitable in these applications since they have good processability, **low dielectric constant**, high thermal stability, low moisture absorption, good mechanical properties and the like.
DETD The preferred silane coupling agents contain an Si--O-alkyl group such as **SiOC**.sub.2 H.sub.5 by which it is intended that such silane coupling agents contain up to about three Si---O-alkyl groups.
DETD . . . PMDA-ODA to THERMID adhesion was 68 g/mm. In another experiment
the THERMID 6015, after curing, was down-streamed ashed with Plasmatech **plasma** equipment using **oxygen** and nitroso oxide gases
followed by spin coating a non-acid precursor of PMDA-ODA polyimide at a
thickness of 20 .mu.m. . . .
DETD In other embodiments, the glass ceramic substrate previously described was similarly ashed by means of an **oxygen plasma** and a silane coupling agent applied which was baked at 85.degree. C. for thirty minutes after which a thin layer. . .
CLM What is claimed is:
. . . 3. The process of claim 2 where said silane coupling agent contains a
Si--O-alkyl group and said plasma comprises a **plasma** based on **oxygen**, nitroso oxide or argon.

L14 ANSWER 7 OF 10 USPATFULL
AN 96:99290 USPATFULL
TI Adhesive layer in multi-level packaging and organic material as a metal diffusion barrier
IN Adamopoulos, Eleftherios, Bronx, NY, United States
Lee, Kang-Wook, Yorktown Heights, NY, United States
O'Toole, Terrence R., Hopewell Junction, NY, United States
Purushothaman, Sampath, Yorktown Heights, NY, United States
Shaw, Jane M., Ridgefield, CT, United States
Viehbeck, Alfred, Stormville, NY, United States
Walker, George F., New York, NY, United States
PA International Business Machines Corporation, Armonk, NY, United States (U.S. corporation)
PI US 5569739 19961029
AI US 1994-197941 19940217 (8)

RLI   Division of Ser. No. US 1991-771929, filed on 7 Oct 1991, now patented, Pat. No. US 5326643
DT   Utility
EXNAM   Primary Examiner: Nutter, Nathan M.; Assistant Examiner: Jones, Richard
LREP   Scully, Scott, Murphy & Presser
CLMN   Number of Claims: 16
ECL   Exemplary Claim: 1
DRWN   6 Drawing Figure(s); 5 Drawing Page(s)
LN.CNT 1040
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
SUMM   . . . dielectric layers in electronic packaging, especially multilevel packaging. Polyimides are especially suitable in these applications since they have good processability, **low dielectric constant**, high thermal stability, low moisture absorption, good mechanical properties and the like.
DETD   The preferred silane coupling agents contain an Si-O-alkyl group such as **SiOC**.sub.2 H.sub.5 by which it is intended that such silane coupling agents contain up to about three Si-O-alkyl groups.
DETD   . . . PMDA-ODA to THERMID adhesion was 68 g/mm. In another experiment the THERMID 6015, after curing, was down-streamed ashed with Plasmatech **plasma** equipment using **oxygen** and nitroso oxide gases followed by spin coating a non-acid precursor of PMDA-ODA polyimide at a thickness of 20 .mu.m. . .
DETD   In other embodiments, the glass ceramic substrate previously described was similarly ashed by means of an **oxygen plasma** and a silane coupling agent applied which was baked at 85.degree. C. for thirty minutes after which a thin layer. . .

L14 ANSWER 8 OF 10 USPATFULL
AN   94:57688 USPATFULL
TI   Adhesive layer in multi-level packaging and organic material as a metal diffusion barrier
IN   Adamopoulos, Eleftherios, Bronx, NY, United States
        Kim, Jungihl, Seoul, Korea, Republic of
        Lee, Kang-Wook, Yorktown Heights, NY, United States
        Oh, Tae S., Cheongryang, Korea, Republic of
        O'Toole, Terrence R., Hopewell Junction, NY, United States
        Purushothaman, Sampath, Yorktown Heights, NY, United States
        Ritsko, John J., Mount Kisco, NY, United States
        Shaw, Jane M., Ridgefield, CT, United States
        Viehbeck, Alfred, Stormville, NY, United States
        Walker, George F., New York, NY, United States
PA   International Business Machines Corporation, Armonk, NY, United States (U.S. corporation)
PI   US 5326643 19940705
AI   US 1991-771929 19911007 (7)
DT   Utility
EXNAM   Primary Examiner: Ryan, Patrick J.; Assistant Examiner: Lee, Kam F.
LREP   Scully, Scott, Murphy & Presser
CLMN   Number of Claims: 31
ECL   Exemplary Claim: 1
DRWN   5 Drawing Figure(s); 5 Drawing Page(s)
LN.CNT 1061
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
SUMM   . . . dielectric layers in electronic packaging, especially multilevel packaging. Polyimides are especially suitable in these applications since they have good processability, **low dielectric constant**, high thermal stability, low moisture absorption, good mechanical properties and the like.
DETD   The preferred silane coupling agents contain an Si--O--alkyl group such as **SiOC**.sub.2 H.sub.5 by which it is intended that such silane coupling agents contain up to about three Si--O--alkyl groups.

DETD . . . PMDA-ODA to THERMID adhesion was 68 g/mm. In another experiment
the THERMID 6015, after curing, was down-streamed ashed with Plasmatech **plasma** equipment using **oxygen** and nitroso oxide gases
followed by spin coating a non-acid precursor of PMDA-ODA polyimide at a
thickness of 20 .mu.m. . . .

DETD In other embodiments, the glass ceramic substrate previously described was similarly ashed by means of an **oxygen plasma** and
a silane coupling agent applied which was baked at 85.degree. C. for thirty minutes after which a thin layer. . .

L14 ANSWER 9 OF 10 JAPIO COPYRIGHT 2000 JPO
AN 1999-111714 JAPIO
TI MANUFACTURE OF SILICON INSULATING FILM
IN UCHIDA TADATAKA
PA JAPAN SCIENCE & TECHNOLOGY CORP, JP (CO)
PI JP 11111714 A 19990423 Heisei
AI JP1997-270732 (JP09270732 Heisei) 19971003
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 99, No. 4
AB PURPOSE: TO BE SOLVED:To form a silicon insulating film having **oxygen**-resistant **plasma** property and hygroscopicity and having a **low dielectric constant** at a **low** temperature, by introducing a mixed gas or a liquid containing a cyanate-~~group and alkyl-group-having~~ silicon material and a tertiary amine. . . vapor of the alkyl isocyanate at atmospheric pressure or a reduced pressure, thereby thermally decomposing them and hence depositing a **silicon dioxide** film containing a **methyl** group on a substrate 5 at a low deposition temperature of about ~~100.degree.C. A silicon~~ insulating film having **oxygen**-resistant **plasma** property and hygroscopicity and having a low dielectric cmtant can be formed.

L14 ANSWER 10 OF 10 EUROPATFULL COPYRIGHT 2000 WILA

PATENT APPLICATION - PATENTANMELDUNG - DEMANDE DE BREVET

AN 960958 EUROPATFULL ED 19991212 EW 199948 FS OS
TIEN Method for producing hydrogenated silicon oxycarbide films.
TIDE Verfahren zur Herstellung von hydriertem Silizium-Oxy-Karbid.
TIFR Procede pour la preparation de silicium-oxy-carbure hydrogene.
IN Loboda, Mark Jon, 1902 Vine Street, Midland, Michigan 48640, US; Seifferly, Jeffrey Alan, 3007 Linden Park Drive, Bay City, Michigan 48706, US
PA DOW CORNING CORPORATION, 3901 S. Saginaw Road, Midland Michigan 48686-0994, US
PAN 275274
AG Patentanwaelte Sternagel & Fleischer, Braunsberger Feld 29, 51429 Bergisch Gladbach, DE
AGN 101441
OS ESP1999088 EP 0960958 A2 991201
SO Wila-EPZ-1999-H48-T1a
DT Patent
LA Anmeldung in Englisch; Veroeffentlichung in Englisch
DS R AT; R BE; R CH; R CY; R DE; R DK; R ES; R FI; R FR; R GB; R GR; R IE; R IT; R LI; R LU; R MC; R NL; R PT; R SE; R AL; R LT; R LV; R MK; R RO; R SI
PIT EPA2 EUROPAEISCHE PATENTANMELDUNG
PI EP 960958 A2 19991201
OD 19991201
AI EP 1999-110260 19990527
PRAI US 1998-86811 19980529
ABEN This invention is a method for producing hydrogenated silicon oxycarbide

(H:**SiOC**) films having a **low dielectric constant**. This method comprises reacting an methyl-containing silane in a controlled **oxygen** environment using **plasma** enhanced or ozone assisted chemical vapor deposition to produce said films. The resulting films are useful in the manufacture of. . .

DETDEN. . . have high dielectric constants (i.e. 3.8 or greater). Therefore there is a need for processes and materials that result in **low dielectric constant** films. A new deposition processes known as **Low-k Flowfill**.reg., produces films having a dielectric constant of <3.0. This method uses a chemical vapor deposition reaction between methylsilane and hydrogen peroxide to produce a **methyl** doped **silicon oxide** film (See S. McClatchie, K. Beekmann, A. Kiermasz; **Low Dielectric Constant** Oxide Films Deposited Using CVD Techniques, 1988 DUMIC Conference Proceedings, 2/98, p. 311-318). However, this process requires a non standard. . .

An object of this invention is to provide a method for producing **low dielectric constant** thin films of hydrogenated silicon oxycarbide by chemical vapor deposition.

This invention pertains to a method of producing thin films of hydrogenated silicon oxycarbide (H:**SiOC**) having **low dielectric constants** on substrates, preferably semiconductor devices. The method comprises the plasma enhanced or ozone enhanced chemical vapor deposition of a reaction. . .

Another . . . the method of this invention is the ability to link successive growth processes to produce multilayer structures for example of SiO.sub2./H:**SiOC**/SiO.sub2. or SiC:H/H:**SiOC**/SiC:H by increasing or deleting the oxygen providing gas at the appropriate time during the CVD process. It is preferred to. . .

The films produced, due to the **low dielectric constant**, are particularly suited as interlayer dielectrics in semiconductor integrated circuit manufacturing such as gate dielectrics, premetal and intermetal dielectrics and. . .

CLMEN. . . silane and the oxygen providing gas to produce a film containing successive layers selected from the group consisting of SiO.sub2., H: **SiOC** and SiC:H.

L12 ANSWER 1 OF 7 USPATFULL
AN 97:9818 USPATFULL
TI Adhesive layer in multi-level packaging and organic material as a metal diffusion barrier
IN Adamopoulos, Eleftherios, Bronx, NY, United States
Kim, Jungihl, Seoul, Korea, Republic of
Lee, Kang-Wook, Yorktown Heights, NY, United States
Oh, Tae S., Seoul, Korea, Republic of
O'Toole, Terrence R., Hopewell Junction, NY, United States
Purushothaman, Sampath, Yorktown Heights, NY, United States
Ritsko, John J., Mount Kisco, NY, United States
Shaw, Jane M., Ridgefield, CT, United States
Viehbeck, Alfred, Stormville, NY, United States
Walker, George F., New York, NY, United States
PA International Business Machines Corporation, Armonk, NY, United States (U.S. corporation)
PI US 5599582 19970204
AI US 1995-475412 19950607 (8)
RLI Division of Ser. No. US 1994-197941, filed on 17 Feb 1994 which is a division of Ser. No. US 1991-771929, filed on 7 Oct 1991, now patented, Pat. No. US 5326643
DT Utility
EXNAM Primary Examiner: Beck, Shrive; Assistant Examiner: Cameron, Erma
LREP Scully, Scott, Murphy & Presser
CLMN Number of Claims: 10
ECL Exemplary Claim: 1
DRWN 6 Drawing Figure(s); 5 Drawing Page(s)
LN.CNT 1009
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
SUMM . . . dielectric layers in electronic packaging, especially multilevel packaging. Polyimides are especially suitable in these applications since they have good processability, **low dielectric constant**, high thermal stability, low moisture absorption, good mechanical properties and the like.
DETD The preferred silane coupling agents contain an Si--O-alkyl group such as **SiOC.sub.2 H.sub.5** by which it is intended that such silane coupling agents contain up to about three Si--O-alkyl groups.

L12 ANSWER 2 OF 7 USPATFULL
AN 96:113664 USPATFULL
TI Adhesive layer in multi-level packaging and organic material as a metal diffusion barrier
IN Adamopoulos, Eleftherios, Bronx, NY, United States
Kim, Jungihl, Seoul, Korea, Republic of
Lee, Kang-Wook, Yorktown Heights, NY, United States
Oh, Tae S., Seoul, Korea, Republic of
O'Toole, Terrence R., Hopewell Junction, NY, United States
Purushothaman, Sampath, Yorktown Heights, NY, United States
Ritsko, John J., Mount Kisco, NY, United States
Shaw, Jane M., Ridgefield, CT, United States
Viehbeck, Alfred, Stormville, NY, United States
Walker, George F., New York, NY, United States
PA International Business Machines Corporation, Armonk, NY, United States (U.S. corporation)
PI US 5582858 19961210
AI US 1995-474985 19950607 (8)
RLI Division of Ser. No. US 1994-197941, filed on 17 Feb 1994 76 Ser. No. US

1991-771929, filed on 7 Oct 1991, now patented, Pat. No. US 5326643
DT Utility
EXNAM Primary Examiner: Beck, Shrive; Assistant Examiner: Cameron, Erma
LREP Scully, Scott, Murphy & Presser
CLMN Number of Claims: 14
ECL Exemplary Claim: 1
DRWN 6 Drawing Figure(s); 5 Drawing Page(s)
LN.CNT 1042
SUMM . . . dielectric layers in electronic packaging, especially multilevel packaging. Polyimides are especially suitable in these applications since they have good processability, **low dielectric constant**, high thermal stability, low moisture absorption, good mechanical properties and the like.
DETD The preferred silane coupling agents contain an Si--O-alkyl group such as **SiOC**.sub.2 H.sub.5 by which it is intended that such silane coupling agents contain up to about three Si---O-alkyl groups.

L12 ANSWER 3 OF 7 USPATFULL
AN 96:99290 USPATFULL
TI Adhesive layer in multi-level packaging and organic material as a metal diffusion barrier
IN Adamopoulos, Eleftherios, Bronx, NY, United States
Lee, Kang-Wook, Yorktown Heights, NY, United States
O'Toole, Terrence R., Hopewell Junction, NY, United States
Purushothaman, Sampath, Yorktown Heights, NY, United States
Shaw, Jane M., Ridgefield, CT, United States
Viehbeck, Alfred, Stormville, NY, United States
Walker, George F., New York, NY, United States
PA International Business Machines Corporation, Armonk, NY, United States (U.S. corporation)
PI US 5569739 19961029
AI US 1994-197941 19940217 (8)
RLI Division of Ser. No. US 1991-771929, filed on 7 Oct 1991, now patented, Pat. No. US 5326643
DT Utility
EXNAM Primary Examiner: Nutter, Nathan M.; Assistant Examiner: Jones, Richard
LREP Scully, Scott, Murphy & Presser
CLMN Number of Claims: 16
ECL Exemplary Claim: 1
DRWN 6 Drawing Figure(s); 5 Drawing Page(s)
LN.CNT 1040
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
SUMM . . . dielectric layers in electronic packaging, especially multilevel packaging. Polyimides are especially suitable in these applications since they have good processability, **low dielectric constant**, high thermal stability, low moisture absorption, good mechanical properties and the like.
DETD The preferred silane coupling agents contain an Si-O-alkyl group such as **SiOC**.sub.2 H.sub.5 by which it is intended that such silane coupling agents contain up to about three Si-O-alkyl groups.

L12 ANSWER 4 OF 7 USPATFULL
AN 94:57688 USPATFULL
TI Adhesive layer in multi-level packaging and organic material as a metal diffusion barrier
IN Adamopoulos, Eleftherios, Bronx, NY, United States
Kim, Jungihl, Seoul, Korea, Republic of
Lee, Kang-Wook, Yorktown Heights, NY, United States
Oh, Tae S., Cheongryang, Korea, Republic of
O'Toole, Terrence R., Hopewell Junction, NY, United States
Purushothaman, Sampath, Yorktown Heights, NY, United States
Ritsko, John J., Mount Kisco, NY, United States
Shaw, Jane M., Ridgefield, CT, United States
Viehbeck, Alfred, Stormville, NY, United States

Walker, George F., New York, NY, United States
PA International Business Machines Corporation, Armonk, NY, United States (U.S. corporation)
PI US 5326643 19940705
AI US 1991-771929 19911007 (7)
DT Utility
EXNAM Primary Examiner: Ryan, Patrick J.; Assistant Examiner: Lee, Kam F.
LREP Scully, Scott, Murphy & Presser
CLMN Number of Claims: 31
ECL Exemplary Claim: 1
DRWN 5 Drawing Figure(s); 5 Drawing Page(s)
LN.CNT 1061
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
SUMM . . . dielectric layers in electronic packaging, especially multilevel packaging. Polyimides are especially suitable in these applications since they have good processability, **low dielectric constant**, high thermal stability, low moisture absorption, good mechanical properties and the like.
DETD The preferred silane coupling agents contain an Si--O--alkyl group such as **SiOC**.sub.2 H.sub.5 by which it is intended that such silane coupling agents contain up to about three Si--O--alkyl groups.

L12 ANSWER 5 OF 7 USPATFULL
AN 93:22898 USPATFULL
TI Process for preparing brominated telomers of chlorotrifluoroethylene
IN Caporiccio, Gerardo, Milan, Italy
Gornowicz, Gerald A., Midland, MI, United States
Boutevin, Bernard, Montpellier, France
PA Dow Corning Corporation, Midland, MI, United States (U.S. corporation)
PI US 5196614 19930323
AI US 1992-874900 19920429 (7)
RLI Continuation-in-part of Ser. No. US 1990-590850, filed on 1 Oct 1990, now patented, Pat. No. US 5110973 which is a continuation-in-part of Ser. No. US 1989-373393, filed on 30 Jun 1989, now abandoned
DT Utility
EXNAM Primary Examiner: Prescott, Arthur C.
LREP Gobrogge, Roger E.
CLMN Number of Claims: 7
ECL Exemplary Claim: 1
DRWN No Drawings
LN.CNT 710
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
SUMM **low dielectric constant** and high resistivity and dielectric strength
DETD . . . from 12.85 to 16.31 ppm. using tetramethylsilane as the reference. This was attributed to a silane of the structure (R.sub.f).sub.3 **SiOC**.sub.2 H.sub.5 (B), where R.sub.f is C.sub.2 F.sub.5 (C.sub.2 F.sub.3 Cl).sub.n C.sub.3 F.sub.6 C.sub.2 H.sub.4, where the average value for n. . .

L12 ANSWER 6 OF 7 USPATFULL
AN 92:101152 USPATFULL
TI Chemically inert fluorinated organosilicon compounds and fluorocarbon telomers for preparing same
IN Caporiccio, Gerardo, Midland, MI, United States
PA Dow Corning Corporation, Midland, MI, United States (U.S. corporation)
PI US 5169998 19921208
AI US 1991-763771 19910923 (7)
RLI Division of Ser. No. US 1990-590850, filed on 1 Oct 1990, now patented, Pat. No. US 5110973 which is a continuation-in-part of Ser. No. US 1989-373393, filed on 30 Jun 1989, now abandoned
DT Utility
EXNAM Primary Examiner: Shaver, Paul F.
LREP Spector, Robert
CLMN Number of Claims: 4

ECL Exemplary Claim: 1
DRWN No Drawings
LN.CNT 687
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
DETD **low dielectric constant** and high resistivity and dielectric strength
DETD . . . from 12.85 to 16.31 ppm. using tetramethylsilane as the reference. This was attributed to a silane of the structure (R.sub.f).sub.3 **SiOC**.sub.2 H.sub.5 (B), where R.sub.f is C.sub.2 F.sub.5 (C.sub.2 F.sub.3 Cl).sub.n C.sub.3 F.sub.6 C.sub.2 H.sub.4 --, where the value for n. . .

L12 ANSWER 7 OF 7 USPATFULL
AN 92:36358 USPATFULL
TI Chemically inert fluorinated organosilicon compounds
IN Caporiccio, Gerardo, Midland, MI, United States
PA Dow Corning Corporation, Midland, MI, United States (U.S. corporation)
PI US 5110973 19920505
AI US 1990-590850 19901001 (7)
RLI Continuation-in-part of Ser. No. US 1989-373393, filed on 30 Jun 1989, now abandoned
DT Utility
EXNAM Primary Examiner: Prescott, Arthur C.; Assistant Examiner: Shaver, P. F.
LREP Spector, Robert
CLMN Number of Claims: 8
ECL Exemplary Claim: 1
DRWN No Drawings
LN.CNT 703
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
DETD **low dielectric constant** and high resistivity and dielectric strength
DETD . . . from 12.85 to 16.31 ppm. using tetramethylsilane as the reference. This was attributed to a silane of the structure (R.sub.f).sub.3 **SiOC**.sub.2 H.sub.5 (B), where R.sub.f is C.sub.2 F.sub.5 (C.sub.2 F.sub.3 Cl).sub.n C.sub.3 F.sub.6 C.sub.2 H.sub.4 --, where the value for n. . .

05851304 **Image available**
OPTICAL PICKUP AND OPTICAL ELEMENT USED FOR THE SAME

PUB. NO.: 10-134404 [JP 10134404 A]
PUBLISHED: May 22, 1998 (19980522)
INVENTOR(s): FUJITA MITSURU
APPLICANT(s): TOYO COMMUN EQUIP CO LTD [000310] (A Japanese Company or Corporation), JP (Japan)
APPL. NO.: 09-050993 [**JP 9750993**]
FILED: February 19, 1997 (19970219)
INTL CLASS: [6] G11B-007/135; G02B-005/04; G02B-005/18; G02B-005/30; G02B-027/28; G02B-027/40; G11B-007/125; G11B-019/12
JAPIO CLASS: 42.5 (ELECTRONICS -- Equipment); 29.2 (PRECISION INSTRUMENTS -- Optical Equipment)
JAPIO KEYWORD: R002 (LASERS); R011 (LIQUID CRYSTALS); R102 (APPLIED ELECTRONICS -- Video Disk Recorders, VDR)

ABSTRACT

PROBLEM TO BE SOLVED: To provide an optical pickup which contributes to the miniaturization of a reproducing device and is easy to handle and an optical element used for the same.

SOLUTION: Diffraction grating patterns are formed on a double refractive plate exclusive of the desired region disposed at nearly its central part. These diffraction grating patterns consist of ion exchange regions 13 which are periodically formed by having a prescribed width and length and a prescribed thickness in a incident optical axis direction and dielectric films 14 which are formed atop these ion exchange regions. The thickness d(sub 2) of the ion exchange regions 13 and the film thickness d(sub 3) of the dielectric films 14 are so set that the ordinary rays to the double refractive plate transmit the diffraction grating patterns and the zero order diffracted waves of extraordinary rays are shut off by the diffraction grating patterns.

Warning List

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methylsilane <or> trimethylsilane [Refine]

Collection: ☑ Journals ☑ Conferences ☑ Standards

Your search matched **5** of **611176** documents.

5 are presented on this page, sorted by Score in descending order.

DOC TYPE	VIEW ISSUE TOC	VIEW FULL PAGE	VIEW CITATION
CNF	TOC	PDF	**CVD photoresist processes for sub-0.18 design rules** *Weidman, T.; Sugiarto, D.; Nault, M.; Mui, D.; Osborne, Z.; Lee, C.; Yang, J.* VLSI Technology, 1998. Digest of Technical Papers. 1998 Symposium on , 1998 , Page(s): 166 -167
CNF	TOC	PDF	**A highly reliable self-planarizing low-k intermetal dielectric for sub-quarter micron interconnects** *Matsuura, M.; Tottori, I.; Goto, K.; Maekawa, K.; Mashiko, Y.; Hirayama, M.* Electron Devices Meeting, 1997. Technical Digest., International , 1997 , Page(s): 785 -788
CNF	TOC	PDF	**Low temperature MOCVD growth of V/VI materials via a Me/sub 3/SiNMe/sub 2/ elimination reaction** *Groshens, T.J.; Gedridge, R.W., Jr.; Scheri, R.; Cole, T.* Thermoelectrics, 1996., Fifteenth International Conference on , 1996 , Page(s): 430 -434
PER	TOC	PDF	**Narrow-linewidth 1.3 mu m DFB-DCPBH lasers with lambda /4-shifted first-order gratings fabricated by electron beam lithography using a new fast resist** *Zah, C.E.; Caneau, C.; Menocal, S.G.; Lin, P.S.D.; Gozdz, A.S.; Favire, F.; Lee, T.P.* Electronics Letters Volume: 24 2 , 21 Jan. 1988 , Page(s): 94 -96
PER	TOC	PDF	**SiC/Si heterojunction diodes fabricated by self-selective and by blanket rapid thermal chemical vapor deposition** *Yih, P.H.; Li, J.P.; Steckl, A.J.* Electron Devices, IEEE Transactions on Volume: 41 3 , March 1994 , Page(s): 281 -287

7/20/00
EK

	L #	Hits	Search Text	DBs	Time Stamp
1	L1	36836	DIELECTRIC ADJ (CONSTANT!)	USPAT; EPO; JPO	2000/07/20 12:33
2	L5	666	methylsilane	USPAT; EPO; JPO	2000/07/20 12:33
3	L9	11	trimethysilane	USPAT; EPO; JPO	2000/07/20 12:33
4	L13	28	(5 or 9) and 1	USPAT; EPO; JPO	2000/07/20 12:34

7/20/00 EK

	L #	Hits	Search Text	DBs	Time Stamp
1	L1	36836	dielectric adj constant!	USPAT; EPO; JPO	2000/07/19 15:03
2	L5	388641	methyl	USPAT; EPO; JPO	2000/07/19 15:03
3	L9	107343	"ch.sub.3"	USPAT; EPO; JPO	2000/07/19 15:04
4	L13	10130	(5 or 9) with (silicon or "SiO.sub.2")	USPAT; EPO; JPO	2000/07/19 15:07
5	L17	12	1 with 13	USPAT; EPO; JPO	2000/07/19 15:46
6	L21	1861621	remov$3	USPAT; EPO; JPO	2000/07/19 15:48
7	L25	8180	oxygen near3 (plasma not blood)	USPAT; EPO; JPO	2000/07/19 15:49
8	L29	2525	21 with 25	USPAT; EPO; JPO	2000/07/19 15:50
9	L37	156	(29 WITH carbon)	USPAT; EPO; JPO	2000/07/19 15:55
10	L33	15	29 with (5 or 9)	USPAT; EPO; JPO	2000/07/19 15:51
11	L41	303	(29 WITH (organic or organo))	USPAT; EPO; JPO	2000/07/19 15:56
12	L45	32	(37 or 41) and 1	USPAT; EPO; JPO	2000/07/19 18:45
13	L49	1947	reduc$4 near4 1	USPAT; EPO; JPO	2000/07/19 18:46
14	L53	2509	lower near4 1	USPAT; EPO; JPO	2000/07/19 18:48
15	L61	5	(49 same 25)	USPAT; EPO; JPO	2000/07/19 18:48
16	L57	62	49 and 25	USPAT; EPO; JPO	2000/07/19 18:55

EK 7/19/00

	L #	Hits	Search Text	DBs	Time Stamp
1	L1	530	alkylsilane	USPAT; EPO; JPO	2000/07/20 14:54
2	L5	4302	organosilane	USPAT; EPO; JPO	2000/07/20 14:54
3	L9	1180	organic adj silane	USPAT; EPO; JPO	2000/07/20 14:54
4	L13	685	organo adj silane	USPAT; EPO; JPO	2000/07/20 14:55
5	L17	5930	5 or 9 or 13	USPAT; EPO; JPO	2000/07/20 15:01
6	L21	596	IMD	USPAT; EPO; JPO	2000/07/20 15:01
7	L25	1245	ILD	USPAT; EPO; JPO	2000/07/20 15:01
8	L29	2560	(interlayer or interlevel or intermetal) adj dielectric	USPAT; EPO; JPO	2000/07/20 15:02
9	L33	3888	21 or 25 or 29	USPAT; EPO; JPO	2000/07/20 15:03
10	L37	30	17 and 33	USPAT; EPO; JPO	2000/07/20 15:03
11	L41	28	(1 AND 33)	USPAT; EPO; JPO	2000/07/20 15:03
12	L45	55	37 or 41	USPAT; EPO; JPO	2000/07/20 15:20
13	L49	125369	plasma not blood	USPAT; EPO; JPO	2000/07/20 15:20
14	L53	378169	oxygen	USPAT; EPO; JPO	2000/07/20 15:20
15	L57	5404	nitrous adj oxide	USPAT; EPO; JPO	2000/07/20 15:20
16	L61	34593	ozone	USPAT; EPO; JPO	2000/07/20 15:21
17	L65	4744	nitric adj oxide	USPAT; EPO; JPO	2000/07/20 15:21
18	L69	13022	49 with (53 or 57 or 61 or 65)	USPAT; EPO; JPO	2000/07/20 15:22
19	L73	76642	"O.sub.2"	USPAT; EPO; JPO	2000/07/20 15:22
20	L77	94994	"O.sub.3"	USPAT; EPO; JPO	2000/07/20 15:22
21	L81	5596	"N.sub.2" adj O	USPAT; EPO; JPO	2000/07/20 15:22
22	L85	3853	(49 WITH (73 or 77 or 81))	USPAT; EPO; JPO	2000/07/20 15:23
23	L89	15170	69 or 85	USPAT; EPO; JPO	2000/07/20 15:23
24	L97	251	89 and 17	USPAT; EPO; JPO	2000/07/20 15:24
25	L93	26	89 and 1	USPAT; EPO; JPO	2000/07/20 15:37
26	L101	36836	dielectric adj constant!	USPAT; EPO; JPO	2000/07/20 15:38
27	L105	52	(93 or 97) and 101	USPAT; EPO; JPO	2000/07/20 16:45
28	L109	4189	(reduc$3 or lower$2) near5 101	USPAT; EPO; JPO	2000/07/20 16:53
29	L113	45	49 with 109	USPAT; EPO; JPO	2000/07/20 17:15